The impact of experience on the behavior and performance of self-employed and entrepreneurs. Three empirical studies

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Publication date:
2017

Document Version
Publisher's PDF, also known as Version of record

The impact of experience on the behavior and performance of self-employed and entrepreneurs

Three empirical studies

Proefschrift ter verkrijging van de graad van doctor
aan Tilburg University
op gezag van de rector magnificus, prof. dr. E.H.L. Aarts,
in het openbaar te verdedigen ten overstaan van een
door het college voor promoties aangewezen commissie
in de aula van de Universiteit op vrijdag 20 oktober 2017 om 10.00 uur
door

Grietje Anne Spanjer
geboren op 13 juni 1989 te Harlingen

Promotores: prof. dr. A. van Witteloostuijn
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dr. G. van der Laan
prof. dr. U. Weitzel

Knowledge is a treasure,
but practice is the key to it.
Lao Tzu

ISBN: 978 90 5668 524 9

This research was funded by the Nederlandse Organisatie voor Wetenschappelijk Onderzoek and the Kunstenbond (grant number 407-12-008).

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Chapter 1

Introduction

Entrepreneurs can be studied from many angles. We will study the phenomenon of entrepreneurship from the management discipline. More specifically, we will look at the role of experience in the success of an entrepreneur. Thus far, several scholars have highlighted the importance of learning when studying entrepreneurship (e.g. Harrison & Leitch, 2005). As Minniti and Bygrave (2001:7) put it, "entrepreneurship is a process of learning, and a theory of entrepreneurship requires a theory of learning". The theory of learning they propose is that entrepreneurs learn from their experiences. This learning involves two types of knowledge: i.e., knowledge on the industry and knowledge on how to be an entrepreneur. As they gain more experience, entrepreneurs accumulate knowledge. The future choices an entrepreneur makes depend on his or her past experiences. Hence, knowledge is path-dependent and the knowledge base of each entrepreneur is unique.

Morris, Kuratko, Schindehutte and Spivack (2012) identify five approaches entrepreneurship scholars have taken in using the term "experience". Whereas some scholars regard experience, and skills and knowledge as two separate concepts where one may lead to the other, others use experience to measure skills and knowledge. Unger, Rauch, Frese, and Rosenbusch (2011) address the importance of distinguishing

between human capital investments, experience, and human capital outcomes, knowledge and skills. This is because the extent to which an entrepreneur learns from his or her experiences varies per "experience". Several scholars have argued that there are different levels of learning. So-called higher-level learning occurs when an entrepreneur is forced to reanalyze his or her experience due to, for example, failure, and consequently adapts his or her routines (Argyris & Schön, 1978; Cope, 2005). Lower-level learning takes place when a person gains experience, but this experience does not force him or her to reanalyze his or her experience, implying that routines remain unchanged or are only minimally adapted (Appelbaum & Goransson, 1997; Argyris & Schön, 1978).

Parker (2006) addresses the three questions scholars studying entrepreneurial learning have been trying to answer. These are what an entrepreneur learns, why s/he learns and how s/he learns. As mentioned above, scholars have argued that skills and knowledge is what entrepreneurs learn from experience (e.g. Argyris & Schön, 1978; Minniti & Bygrave, 2001). How they learn is through experience. Some scholars even go as far as arguing that the only way entrepreneurs learn is through learning-by-doing (Dalley & Hamilton, 2000; Minniti & Bygrave, 2001). Why they learn is to increase their entrepreneurial performance (e.g. Baum & Bird, 2010; Baum, Bird, & Singh, 2011). The answers to these three questions uncovers a causal chain. That is, through experience entrepreneurs learn skills and knowledge. These skills and knowledge are necessary to improve their entrepreneurial performance.

Experience diversity

Literature focusing on the role of having diverse experiences in (a) the choice to become an entrepreneur and (b) the success as an entrepreneur

builds on the experience literature. That is, it assumes, just like the experience literature, that entrepreneurs learn skills and knowledge from their experiences. Lazear's jacks-of-all-trades theory can illustrate this argument. Key to this theory is that individuals who have more diverse experiences are more likely to become entrepreneur. This is either because individuals intend to become an entrepreneur, and thus choose to learn diverse skills through education or work experience, or because individuals who have a love for variety find themselves more suited for entrepreneurship (Lazear, 2005).

Entrepreneurs need a wide variety of skills and knowledge to be able to fulfill the diverse tasks associated with entrepreneurship (Lazear, 2004, 2005). This diverse skill and knowledge set is to come from diverse experiences. Hence, entrepreneurs need to be generalists with a balanced skill set as their success is determined by their weakest skill. Scholars have found support for the jacks-of-all-trades theory. This implies that individuals with more diverse skills to be more likely to become an entrepreneur (Chen & Thompson, 2016; Lechmann & Schnabel, 2014).

However, only recently scholars have moved beyond studying the relationship between an entrepreneur's skill set and the entry into entrepreneurship, and have begun to study the relationship between an entrepreneur's (balanced) skill set and his or her performance as an entrepreneur. The evidence for the effect of possessing more diverse skills on entrepreneurial performance has been mixed (e.g. Åstebro & Yong, 2016; Hartog, van Praag, & van der Sluis, 2010). Some studies find a balanced skill set to negatively influence entrepreneurial performance (Åstebro & Thompson, 2011), while others report that a balanced skill set is positively associated with entrepreneurial performance (Hartog et al., 2010). Again others reveal that the direction of the relationship is

dependent on the sample and the regression specification chosen (Chen & Thompson, 2016).

Definition entrepreneur

The entrepreneurship literature is fragmented, and knowledge accumulation and theory building are often said to be limited. Harrison and Leitch (2005: 353) argue that "progress in this domain will require changing the questions we ask, the definitions we apply, and the theories we appropriate". One of the issues within this domain is the lack of a common and single definition of "the entrepreneur" (Busenitz et al., 2007; Harrison & Leitch, 2005). In fact, there are many definitions of an entrepreneur circulating in the literature.

Sternberg and Wennekers (2005) argue that the literature on entrepreneurship can be, by and large, divided in two perspectives. These are the occupational notion of entrepreneurship and the behavioral notion of entrepreneurship. The occupational notion of entrepreneurship considers someone to be an entrepreneur when this individual owns a business and manages this business on her or his own account and risk. The behavioral notion of entrepreneurship considers someone to be an entrepreneur when this individual behaves and acts as an entrepreneur. The behavioral notion considers pioneers and innovators to be entrepreneurs (Shane & Venkataraman, 2000; Sternberg & Wennekers, 2005), whereas the occupational notion takes self-employed and business-owners to be entrepreneurs (Sternberg & Wennekers, 2005). Hence, according to the occupational notion self-employed are entrepreneurs, while according to the behavioral notion self-employed are only considered to be entrepreneurs if they develop and deliver pioneering and innovative products or services.

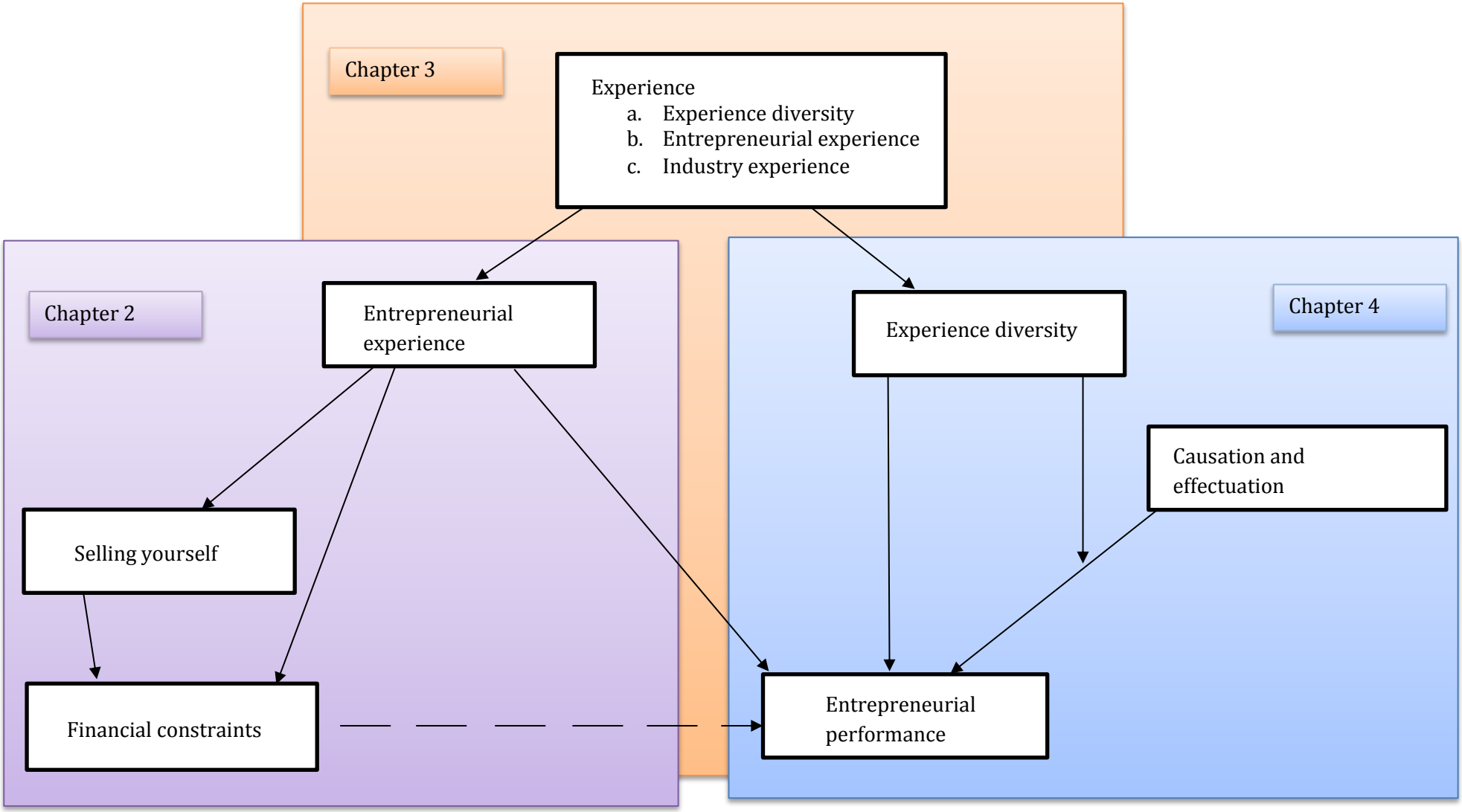
This dissertation follows the occupational notion of the entrepreneur, and considers business owners with employees and those without employees – i.e., self-employed – to be entrepreneurs. That is, we consider individuals to be entrepreneurs if they are registered as business owner at the chamber of commerce.

Although self-employed do not employ people, they do run their own business (Lechmann & Schnabel, 2014). Therefore, they should possess similar skills as a business owner with employees. Moreover, because self-employed do not have employees, they cannot delegate tasks to specialized employees. Hence, the self-employed need to possess expert skills for those activities that they cannot delegate. This implies that self-employed without employees need deeper expert knowledge and skills than entrepreneurs with employees (Lechmann & Schnabel, 2014). Furthermore, because self-employed run their own business, self-employed face the same risk as other entrepreneurs (Parker, 2004).

Research question and structure of the dissertation

This dissertation will contribute to the literature on entrepreneurial learning. Unger et al. (2011) argue that studies investigating human capital and entrepreneurial learning have often taken a static approach to entrepreneurial learning. In their meta-analytic review, they show that the relationship between human capital, be it experience or skills and knowledge, and performance is often influenced by moderators. Hence, they argue that it is important to focus on the examining "the processes of learning, knowledge acquisition, and the transfer of knowledge to entrepreneurial tasks" (Unger et al., 2011: 341). This dissertation will focus on several moderators in the learning-performance relationship.

Figure 1.1 Theoretical Framework



First, as shown in Figure 1.1 we consider the possible different effects of the type of experience when studying the experience-performance relationship, i.e. industry experience, entrepreneurial experience and experience diversity. Furthermore, we analyze conditional indirect effects on the experience-financial constraints relationship and the conditional effect on the experience-performance relationship. For example, we analyze how experience is related to a particular type set of skills important in obtaining funding and how this in turn is associated with experienced financial constraints. Further, we analyze the indirect effect of chosen strategy on the relationship between experience diversity and entrepreneurial performance and the conditional effect of experience diversity on entrepreneurial performance.

Chapter 2 investigates the mediating effect of an entrepreneur's ability to convince others on the relationship between an entrepreneur's experience and his or her experienced financial constraints. In doing so, literature on gatekeepers is combined with literature on entrepreneurial learning. As entrepreneurial experience increases entrepreneurs will learn how to convince others. As they become better in convincing others, and thus also gatekeepers, they will experience less financial constraints. Furthermore, we expect this mediating effect to be stronger for entrepreneurs in arts than for entrepreneurs in the periphery of the creative industries. The creative industries are an ideal testbed to test this relationship, because of the unique characteristics of the creative industries. With the amount of subsidies distributed in the creative industries decreasing entrepreneurs in the creative industries experience relatively much financial constraints. We use data of 1,426 self-employed in the Netherlands to test our hypotheses. To examine the empirical

generalizability of our findings, we replicate our model using a sample of 2,177 self-employed in the Netherlands not active in the creative industries.

In Chapter 3 the relationship between an entrepreneur's level of experience diversity and his or her entrepreneurial performance is examined. In this chapter we combine the literature on cognition and learning with Lazear's jacks-of-all-trades theory. An inverted U-shaped relationship is predicted. To test our theory, we enriched the National Labor Survey Youth, which captures individuals from the start of their working life from 1979 till 2010, with occupational classification data from O*NET. Furthermore, as this is a longitudinal dataset, it allowed us to depreciate for experience. Hence, relaxing the assumption that what was learned at the beginning of one's career is just as valuable as what was learned more recently.

Chapter 4 continues studying the experience diversity-performance relationship using survey data from 3,513 entrepreneurs in the Netherlands. In this chapter, we analyze what the optimal strategy – i.e., causation or effectuation – is given their level of experience diversity. We theorize that entrepreneurs with high levels of experience diversity using effectual logics are likely to produce low entrepreneurial performance, whereas their use of causal logics is associated with high entrepreneurial performance.

The chapters 2 to 4 are developed as research papers. Therefore, they can be read separately without having to read the preceding chapters for full understanding. As these chapters are all based on the entrepreneurial learning literature, there may be some overlap between the chapters. Chapter 5 is a concluding chapter in which the findings of chapter 2 to 4 are discussed.

Chapter 2

Selling yourself, entrepreneurial experience, and financial constraints[1]

A study into self-employed in the creative industries in the Netherlands

Abstract

This study explores the mediating effect of the perceived ability to sell yourself on the relationship between entrepreneurial experience and experienced financial constraints, with a focus on the creative industries. First, we argue that creative entrepreneurs learn to sell what they have to offer to gatekeepers as their experience grows, which reduces their financial constraints. Second, this effect is expected to be stronger for entrepreneurs in the core vis-à-vis those in the periphery of the creative industries. To test these hypotheses, we use survey data on 1,426 creative self-employed in the Netherlands. Contrary to our predictions, results show that creative entrepreneurs experience more financial constraints as their experience grows, and become weaker at selling themselves to others.

[1] This chapter is the result of joint work with Arjen van Witteloostuijn

Although entrepreneurs in the core of the creative industries experience more financial constraints than their counterparts in the periphery, the mediating effect of selling yourself on the relationship between entrepreneurial experience and financial constraints is not stronger for entrepreneurs in the core of the creative industries. To test for the empirical generalizability of our findings, we run the same model on entrepreneurs from other industries than the creative industries, showing that our results are generalizable across industries.

Introduction

This paper explores the mediating effect of the self-perceived ability of selling yourself on the relationship between entrepreneurial experience and experienced financial constraints, particularly in the creative industries. In creative industries, gatekeepers play an important role in sorting access to finance and, thus, in determining a creative entrepreneur's financial constraints. Gatekeepers evaluate an entrepreneur and her/his offer. If an entrepreneur wants to obtain funding, a positive evaluation by gatekeepers is essential. Without such a positive evaluation, obtaining funding is bound to be an uphill battle. So far, literature on gatekeeping has focused on the role that gatekeepers play in selection and influencing processes. We add to this by focusing on the entrepreneurs' ability to sell their offer to gatekeepers. We combine the literature on gatekeeping with that regarding entrepreneurial learning, which argues that an entrepreneur acquires capabilities from learning-through-experience (see, for example, Cope, 2005; Minniti & Bygrave, 2001). Specifically, we examine the role of entrepreneurial experience in acquiring the capabilities to convince gatekeepers on the road to gaining access to financial resources (i.e., external funding and subsidies). As we do not have data on how much

funding entrepreneurs have received, we use the experienced financial constraints as a proxy for the amount of funding received. Of course, this perceptual measure is not without limitations: i.e., some entrepreneurs may feel a stronger need for funding than others, while the amount of funding is exactly the same. To overcome this limitation, we test our theory using a sample of creative entrepreneurs.

Although gatekeepers play a role in most industries, well-known examples being business angels providing venture capital and subsidies granted by governments, they are especially important in the creative industries. According to Baumol's cost disease argument, producing creative products and/or services is labor-intensive in nature. Oftentimes, these production costs cannot be covered fully by the income from selling creative output (Baumol & Bowen, 1966). Furthermore, demand is difficult to anticipate, since demand for creative goods is characterized by large uncertainty. In addition to this, a creative entrepreneur does not know what price s/he will get for her or his work until after the act of selling is completed. For these reasons, many entrepreneurs in the creative industries are dependent on external funding for continuation (Stam, de Jong, & Marlet, 2008). With subsidies in the creative industries decreasing in many countries, many entrepreneurs in these industries experience relatively severe financial constraints. This makes entrepreneurs in the creative industries an ideal testbed for our argument. Additionally, we examine the external validity of our findings in a sample of entrepreneurs from outside the creative industries. Replication studies are essential to establish the reliability and validity of empirical findings (Hubbard, Vetter, & Little, 1998; van Witteloostuijn, 2015).

We collected unique survey data in the Netherlands. Our study focuses on self-employed creatives (n = 1,426), with a replication in a

sample of self-employed non-creatives (n = 2,177). We have chosen to include only self-employed in our sample for specific reasons. That is, our measure of entrepreneurial experience is, unfortunately, does not involve factual information regarding experience with obtaining funding as we do not have data on this. We proxy entrepreneurial experience through organizational age. However, the self-employed provide an ideal setting to test the mediating effect of the self-perceived ability to sell yourself on the relationship between entrepreneurial experience and experienced financial constraints, precisely because self-employed do not have any employees. Hence, they cannot delegate any activities to employees. Of course, self-employed may decide to outsource certain activities. However, this effect is limited because important activities for entrepreneurs, such as selling what you have to offer to others, cannot be outsourced easily.

Theory and hypotheses

The mediating effect of selling yourself

Literature studying how entrepreneurs learn examines the causal relationship between experience and learning (Cope, 2005; Minniti & Bygrave, 2001). The literature has identified different modes of learning, such as learning from peers, learning-by-doing, learning from feedback from customers and suppliers, learning-by-experimenting, and learning from mistakes (Cope, 2011; Gibb, 1997; Minniti & Bygrave, 2001; Young & Sexton, 1997). However, several scholars have argued that learning-by-doing is the most important learning mode for entrepreneurs (Cope & Watts, 2000; Minniti & Bygrave, 2001). That is, entrepreneurs are argued to develop knowledge and skills by accumulating experience. Knowledge involves the "relatively formal and established facts, rules, policies and

procedures" (Nass 1994:39), and skills relate to "information-processing abilities gained from learning by doing and the ability to generate new procedures and conclusions" (Nass 1994:40). As experience accumulates, an entrepreneur's knowledge and skill base grows (Minniti & Bygrave, 2001).

In the creative industries, many entrepreneurs are dependent on external funding for their very continuation (Stam et al., 2008). Gatekeepers are key to access to external funding. Hence, a creative entrepreneur must convince these gatekeepers to obtain external funding (Ebbers & Wijnberg, 2012; Mol & Wijnberg, 2011). Being regarded as legitimate by gatekeepers is instrumental in gaining access to critical resources such as audience acclaim and external funding. Such access to external funding reduces the entrepreneur's financial constraints. The selection and classification system executed by gatekeepers comprises four stages (Wijnberg, 2011). First, gatekeepers classify entrepreneurs and their offerings into categories. Second, a list of criteria is developed for each of the identified categories. Third, gatekeepers determine which entrepreneurs and what offerings belong to what category. Fourth, the categorized entrepreneurs are evaluated against the criteria, and those not categorized are not.

Given these four gatekeeping stages, a creative entrepreneur has two goals. The first goal is to progress into the evaluation stage, to start with. An entrepreneur will not be evaluated at all if gatekeepers decide that s/he and what s/he has on offer does not belong to any of the categories. The lack of such an evaluation will result in the potential providers of external finance not being easily aware of the very existence of this entrepreneur and her/his offering. This will lower the likelihood of receiving any external funding. The second goal, after having progressed into the evaluation stage, is to receive a positive evaluation. Entrepreneurs prefer positive

evaluations, of course, as these are far more likely to lead to access to external funding than negative evaluations.

Because many entrepreneurs in the creative industries are dependent on external funding for continuation (Stam et al., 2008), an entrepreneur is highly motivated to do whatever s/he believes is needed to be evaluated by gatekeepers and to convince them that s/he deserves a positive evaluation. The more entrepreneurial experience an entrepreneur has accumulated, the more experience s/he will have with applying for external funding and in dealing with gatekeepers to obtain positive evaluations. Through this experience, an entrepreneur acquires the skills and knowledge regarding how to convince others to receive the external funding needed to continue.

As Minniti and Bygrave (2001) argue, "entrepreneurs learn by updating a subjective stock of knowledge accumulated on the basis of past experiences" (p. 5). Hence, as an entrepreneur gains more experience, s/he learns which actions result in failure and which actions lead to success. Via this dynamic process of trial-and-error, entrepreneurs improve their skills to sell themselves to others. Hence, they will become better in persuading gatekeepers to (positively) evaluate them. This, in turn, will increase the likelihood that these entrepreneurs gain access to critical resources, such as public subsidies and/or private financing, as these positive evaluations offer a gateway to receive these public subsidies and/or private funds, and thus reduce their financial constraints.

> ***Hypothesis 1:*** *(a) An entrepreneur's entrepreneurial experience is positively associated with this entrepreneur's gatekeeper convincing capabilities, (b) the latter being negatively related with financial constraints.*

Core versus periphery creative industries

The creative industries are a cluster of several sectors that have in common that the creativity of the individual working in one of these industries is essential (Drake, 2003). This is reflected in the definition of the creative industries of Caves (2000). He defines the creative industries as "the industries that supply goods and services that we broadly associate with cultural, artistic, or simply entertainment value" (p. 1). Furthermore, the creative industries are characterized by two critical idiosyncrasies: the "art for art's sake" principle, and the "nobody knows" principle (Bourdieu, 1993; Caves, 2000, 2003). These two idiosyncrasies cause entrepreneurs in the creative industries to be, on average, more dependent on governmental subsidies and/or private financing than their counterparts in other industries.

Firstly, entrepreneurs in the creative industries create art for the sake of creating art. Hence, they tend to be intrinsically motivated (Bourdieu, 1993; Caves, 2000; Hirsch, 2000). Whether the creation of the product or piece of art is profitable or not is something an intrinsically motivated entrepreneur is not concerned with very much. They often have side-jobs to finance the creation of art. This modus operandi is often referred to as the Bohemian lifestyle of artists (Eikhof & Haunschild, 2006), a term stemming from the nineteenth century. This lifestyle is different from other lifestyles by its principles and ideas, such as spontaneity, low income or even a lack of income, and being employed sporadically. Furthermore, this lifestyle is characterized by not considering the creation of art as a means to earn a living, but rather as the road to self-fulfillment. That is, the main motivational driver is the creation of art for art's sake (Bourdieu, 1993; Caves, 2000; Eikhof & Haunschild, 2006). Artistic performance is thus more highly valued, on average, than commercial performance by entrepreneurs

in the creative industries (Becker, 1982; Stam et al., 2008).

A fair share of entrepreneurs in the creative industries define success in terms of the ability and opportunity to create art. The ability to create art is seen as more important than the profitability of the created art (Caves, 2000). In the core of the creative industries, including art forms such as literature, music, visual arts and performing arts, the cultural value of a product is viewed as (much) more important than the commercial value of this creation. By contrast, entrepreneurs in the periphery of the creative industries, including publishing, design, fashion and architecture, produce offerings of which the commercial value is considered to be more important than the cultural value, although the cultural value of a product is still highly regarded (Throsby, 2008). Thus, entrepreneurs in the core of the creative industries are more concerned with the aesthetic and creative value of their products than with the financial returns, compared to entrepreneurs in the periphery of the creative industries. Therefore, success for entrepreneurs in the core of the creative industries is not defined in similar terms as success for entrepreneurs in the periphery of the creative industries.

Secondly, a creative entrepreneur does not know in advance what price s/he will get for her/his work. On top of this, demand for creative products and services is characterized by uncertainty; it is therefore difficult to anticipate to this demand. This is referred to as the "nobody knows property" of creative products (Caves, 2003). Entrepreneurs may try to anticipate what they expect to be the taste of their audiences. However, the extent to which entrepreneurs are able to predict this is limited (Caves, 2003). Renneboog and Spaenjers (2013) identify a few factors that may influence the price of a creative product – e.g., the artist's reputation, sales location, and time of sale. Nevertheless, assessing these factors does not

take away the problem of the high sunk cost associated with creative production. If a creative product does not sell, a substantial part of the costs incurred when making this product cannot be recovered (Caves, 2000).

On the basis of these two principles – i.e., "art for art's sake" and the "nobody knows property" – the expectation is that, within the creative industries, entrepreneurs in the core are more dependent on external funding for continuation than entrepreneurs in the periphery of the creative industries. In the Dutch context, this is also reflected in the subsidies provided to the creative industries by the Ministry of Education, Culture and Science (Ministerie van Onderwijs Cultuur en Wetenschap, 2016). For example, in 201x, the performing arts received a total amount of 175.61 million Euros and museums 64.08 million Euros, whereas the creative industries other than arts, including the periphery of the creative industries, received a total amount of 17.35 million Euros.

For these more financially-dependent entrepreneurs in the creative industry's core, the importance of selling themselves and what they have on offer to others is key, certainly when compared to less financially-dependent entrepreneurs in the periphery; without this "selling yourself" capability, creative entrepreneurs are likely to have a hard time to continue as professional creatives, as this is essential to gain access to the required financial resources by convincing the industry's gatekeepers that they and what they have to offer is worthwhile. This implies that the mediating effect of selling yourself on the relationship between entrepreneurial experience and financial constraints is expected to be stronger for entrepreneurs in the creative industry's core vis-à-vis its periphery.

Moreover, as said above, as an entrepreneur gains more experience, s/he learns which actions result in failure and which lead to success (Cope, 2005; Minniti & Bygrave, 2001). In the creative industries, via this dynamic

process of trial-and-error, entrepreneurs improve their skills to sell themselves and their offering to others. Since entrepreneurs in the core of the creative industries are more dependent on subsidies and support for continuation than their counterparts in the periphery of the creative industries, they tend to accumulate more experience with applying for external funding, such as governmental subsidies, than entrepreneurs in the periphery of the creative industries with a similar spell of entrepreneurial experience. For instance, entrepreneurs in the arts are likely to be better in selling themselves to others than entrepreneurs in periphery of the creative industries, as they have more knowledge as to what actions do and which do not lead to a successful fund application.

> ***Hypothesis 2:*** *With equal entrepreneurial experience, (a) entrepreneurs in the core creative industries are better in selling themselves to others than entrepreneurs in peripheral creative industries, and (b) the negative effect of the entrepreneurs' gatekeeper convincing capabilities on financial constraints is stronger in the creative industry's core vis-à-vis periphery.*

Data and methodology

Data

This study uses survey data of creative entrepreneurs in the Netherlands. The survey was administered in March and April 2015 among 95,254 organizations in the Dutch creative industries. E-mail addresses were obtained via publicly available Chamber of Commerce information using data-scraping techniques. Furthermore, we collaborated with branch organizations representing entrepreneurs in the Dutch creative industries. These organizations distributed the survey among their members.

Respondents were offered a personalized report in which their responses were compared to the answers of the other respondents. Additionally, 50 museum cards, which allow free access to a large number of Dutch museums, were allotted to respondents who fully completed the questionnaire. The cooperating branch organizations were offered a report in which the answers of their members were compared to the answers of the other respondents.

Of the emails sent, 37,030 emails were opened, of which 3,826 were completed. Respondents include both self-employed and entrepreneurs with employees in the creative industries. This study uses only the survey data from self-employed. This results in a sample of 1,426 self-employed. To assess non-response bias, we compared early respondents with late respondents, following Armstrong and Overton (1977). Late respondents are identified as those entrepreneurs who started the survey after the reminder was sent: t-tests indicated that early respondents do not significantly differ from late respondents when comparing them on characteristics such as age, education and experience with being an entrepreneur.

Although both our independent and dependent variables come from the same survey, we do not expect our model to suffer from common-method bias, because we only use parts of a large survey and because we estimate complex models including mediation and moderated mediation (Chang, van Witteloostuijn, & Eden, 2010).

Dependent variable: Financial constraints

Two items were created to measure experienced *Financial constraints.* Respondents were asked to what extent they feel constrained in their access to (a) private funding and (b) public grants and subsidies. As grants

and subsidies are the most important source for external financing for entrepreneurs in the creative industries (Cultuurindex Nederland, 2015), we separated this source of external financing from the other sources of external funding. The items were measured on a seven-point Likert scale, ranging from strongly disagree to strongly agree. The composite reliabilities of the measure are presented in Table 2.1. These are all satisfactory (Hinkin, 1998). The items can be found in Table 2.2.

Table 2.1 Composite reliability and discriminant validity

	Composite Reliability	Average Variance Extracted	Discriminant Validity Index
Financial constraints	.81***(.008)	.68***(.011)	
with Selling yourself			.68[t] (.383)
with Artistic goals			.54***(.023)
with Financial goals			.68***(.061)
Selling yourself	.75***(.009)	.49***(.012)	
with Financial constraints			.49***(.014)
with Artistic goals			.47***(.017)
with Financial goals			.47***(.016)
Artistic goals	.74***(.009)	.44***(.011)	
with Financial constraints			.31***(.022)
with Selling yourself			.42***(.014)
with Financial goals			.44***(.012)
Financial goals	.83***(.015)	.72***(.025)	
with Financial constraints			.72***(.123)
with Selling yourself			.65***(.026)
with Artistic goals			1.95* (.693)

Robust standard errors in parentheses *** p<0.001, ** p<0.01, * p<0.05, and t p<0.10.

Independent variable: Entrepreneurial experience

Entrepreneurial experience is measured as the number of years of experience an individual has with being an entrepreneur (Minniti & Bygrave, 2001). As we do not know whether an individual has owned an enterprise before her/his current venture, we measure this as the age of the self-employed's current business.

Mediator: Selling yourself

Selling yourself is measured using three items. Respondents were asked to what extent they thought they were able to convince highly-qualified individuals to work with them, to convince others to take interest in their work, and to convince others to financially support their work. These items were chosen based on the characteristics that entrepreneurs in the creative industries are known to possess (Klamer, 2011). The items are listed in Table 2.2. These items were measured on a seven-point Likert scale, too, ranging from strongly disagree to strongly agree. The composite reliabilities of the measure can be found in Table 2.1. Again, these are all satisfactory (Hinkin, 1998).

Table 2.2 Scale items

Financial constraints: To what extent do you agree or disagree with the following statements? In achieving my goals, I am constrained ...	By (access to) financing By (access to) subsidies/working grants
Selling yourself: To what extent do you agree with the following statements?	I am able to convince highly qualified individuals to work with me I have the ability to convince others to take interest in my work I am good at convincing others to financially support my work
Artistic goals: How important are the following goals for your organization?	Producing innovative work Artistic freedom Expanding the art form Producing work recognized for its contribution to the field
Financial goals: How important are the following goals for your organization?	Ensuring financial stability Making money

Control variables

Control variables are the *Age* of an entrepreneur, her/his highest obtained degree of formal *Education*, *Gender* (1 = "female"), the average number of *Hours worked per week*, *Creative personality* score, her/his business *Goals*,

whether or not an entrepreneur is *Cost driven* (1 = "yes"), her/his *Hourly rate*, whether or not the income from her/his enterprise is her/his *Sole income source* (1 = "yes"), and whether or not an entrepreneur engages in *Exports* (1 = "yes"). *Education* is measured as the highest completed educational degree, and *Creative personality* with Gough (1979)'s Creative Personality Scale.

Studies have established that an entrepreneur's education positively influences entrepreneurial performance (van der Sluis, van Praag, & Vijverberg, 2008), that entrepreneurial performance of male entrepreneurs exceeds that of their female counterparts (Brush, 1992; Dahl & Sorenson, 2012), that entrepreneurial self-efficacy positively influences performance (Chandler & Jansen, 1997; Chen, Greene, & Crick, 1998), that exporting is positively related to entrepreneurial performance (Greenaway, Guariglia, & Kneller, 2007), that age is positively associated with performance (Dahl & Sorenson, 2012; van der Sluis et al., 2008), and that entrepreneurs with a creative personality are better in opportunity recognition and achieve higher entrepreneurial performance (Lumpkin & Dess, 1996; Shane & Nicolaou, 2015). As higher entrepreneurial performance is logically linked to lower experienced financial constraints, these variables are included in the model as control variables.

The average number of hours worked per week is included, with some entrepreneurs working twice as much as other entrepreneurs. Entrepreneurs who work more, may earn more income, which is likely to result in differences in the experienced financial constraints. *Hourly rate* is added, because some entrepreneurs have an hourly rate that is more than double that of other entrepreneurs. This, too, may give differences in experienced financial constraints. An entrepreneur having different business goals in the sense of valuing commercial rather than artistic

performance highly may attach more importance to financial resources than an entrepreneur valuing artistic instead of commercial performance highly. Hence, the former might invest more time than the latter in selling her/himself to others in order to obtain the required financial resources. Whether or not the entrepreneur is *Cost driven* is included in the model for similar reasons.

Model

To assess the mediating effect of *Selling yourself* on the relationship between *Entrepreneurial experience* and experienced *Financial constraints,* structural equation modeling techniques are applied. The model is estimated in two steps. First, the model is estimated controlling for entrepreneurs operating in the core or periphery of the creative industries, after adding a dummy. Second, the model is run differentiating between two industry clusters, which are "Arts" and "Other creative industries". The entrepreneurs in the arts are classified in line with Braaksma et al. (2005), Rutten, Manshanden, Muskens, and Koops (2004), and Stam et al. (2008). Before estimating the second model, we tested for the level of group invariance between the arts and other creative industries, which indicated that there is metric invariance between these two groups.

Furthermore, before running the structural model, we determine the composite reliabilities, average variance extracted and the discriminant validity of our latent variables. In order to do so, we run these tests on our measurement model. The composite variability, average variance extracted and the discriminant validity index are presented in Table 2.1. The composite reliability of the latent variables should be higher than .70. All our latent variables are above .70. To test the discriminant validity of our latent variables, we perform two tests. First, we estimate the average

variance extracted. This should be higher than .50. Two of our measures, namely *Selling yourself* and *Artistic goals*, are slightly below .50 (Fornell & Larcker, 1981). Second, we calculate the discriminant validity index of each possible pair of latent variables. The discriminant validity index tests whether the average variance extracted of each latent variable is larger than the variance shared with other latent variables. This index should be larger than 0 (Fornell & Larcker, 1981). As can be found in Table 2.1, each pair of latent variables meets this criterion. Because the discriminant validity index measures the average variance extracted in relation to the other latent variables, this second test is a stronger test for discriminant validity than our first test. Hence, we find evidence for discriminant validity.

Following Anderson and Gerbing (1988), we first estimate the measurement model, including the latent variables *Selling yourself, Financial constraints, Artistic goals* and *Financial goals*. We then constrain the factor loadings of *Selling yourself* and *Financial constraints*. This allows us to compare the first and second model, as the scores of self-employed for *Selling yourself* and *Financial constraints* are calculated in the exactly the same way across both models.

Results

Table 2.3 presents the descriptive statistics and covariances. Table 2.4 gives the correlations. The average age of the entrepreneurs in our sample is 45. Our sample includes slightly more male than female entrepreneurs. Approximately, one-third of the entrepreneurs of our sample have an additional source of income.

Figure 2.1 shows the estimates of the model in which we controlled for whether or not entrepreneurs operate in the core of the creative industries (a dummy). Indeed, this reveals that entrepreneurs in the arts

experience more financial constraints than entrepreneurs in the periphery of the creative industries. Entrepreneurs who regard themselves as being good at selling themselves to others experience less financial constraints. Entrepreneurs with more entrepreneurial experience indicate that they are not good at selling themselves to others. Furthermore, entrepreneurs with more experience as an entrepreneur report more financial constraints. This pair of findings is the opposite of what was hypothesized. When estimating the indirect effects of this model, results show that *Selling yourself* does not significantly mediate the relationship between *Entrepreneurial experience* and experienced *Financial constraints* (β=.00103, p=.155, CI[-.000; .002]). We, therefore, cannot accept the first hypothesis.

Figure 2.2 provides the model in which we further classify the creative industries into two industry clusters (the arts and other creative industries). The signs of the coefficients remain unchanged. However, the coefficients are now no longer significant, with two exceptions. In the arts, entrepreneurs who have more experience consider themselves to be less good at selling themselves to others. In the other creative industries, entrepreneurs who have more entrepreneurial experience report more financial constraints. Calculations of the indirect effects show us that *Selling yourself* does not significantly mediate the effect of *Entrepreneurial experience* on experienced *Financial constraints* (β=-.0021, p=.219 CI[-.0012 ; .0053]) for entrepreneurs in the arts. Furthermore, *Selling yourself* does not significantly mediate the effect of *Entrepreneurial experience* on experienced *Financial constraints* (β=-.0003, p=.632 CI[-.0008 ; .0014]) for entrepreneurs operating in other creative industries. We, therefore, fail to accept the second hypothesis.

Post hoc analyses

In an attempt to find an explanation for the unexpected negative relationship between *Entrepreneurial experience* and *Selling yourself*, we perform three post hoc analyses. First, we test for a potential moderated mediating effect, using an entrepreneur's emphasis on financial goals as a moderator on the relationship between *Entrepreneurial experience* and *Selling yourself*. Second, we take a closer look at the scatterplots of *Entrepreneurial experience* and *Selling yourself*. Third, we ran our first model on a second sample including entrepreneurs active in other than the creative industries to analyze whether or not our unexpected findings might be unique for the creative industries.

Post hoc analysis 1

Different motivational priorities are likely to trigger different types of behavior. Indeed, several studies have shown that the motivation to learn positively influences learning outcomes (e.g., Colquitt, LePine, & Noe, 2000; Tannenbaum & Yukl, 1992). As a robustness check, we therefore test for moderated mediation. Entrepreneurs who find making money important and who prefer financial stability may feel a higher urge for grants, subsidies or other types of financing than entrepreneurs who find making money and ensuring financial stability less important. Entrepreneurs who are more eager for funding, may be more motivated to convince others that they are the right person to receive this funding vis-à-vis entrepreneurs who do not consider ensuring financial stability and making money as their most important goals.

Table 2.3 Descriptive statistics and covariances

	Variable	Mean	Std. Dev.	Min	Max	1	2	3	4	5	6	7
1	Financial constraints	-0.30	1.34	-3.23	2.56	1.80						
2	Selling yourself	0.61	0.68	-2.18	2.12	0.04	0.47					
3	Experience	9.60	8.31	0	51	0.35	-0.02	69.07				
4	Creative personality	4.59	3.04	-5	15	0.32	0.71	3.23	9.25			
5	Cost driven	0.43	0.50	0	1	0.03	-0.04	0.01	-0.11	0.25		
6	Hourly wage	52.16	47.86	0	1000	-6.49	5.21	37.63	9.46	-1.83	2290.82	
7	Sole income source	0.70	0.46	0	1	-0.02	0.02	0.03	-0.01	-0.01	1.82	0.21
8	Hours worked per week	42.42	15.45	0	118	2.62	2.25	5.27	5.76	-0.30	11.22	0.30
9	Export	0.33	0.47	0	1	0.07	0.04	0.53	0.16	-0.01	0.83	0.01
10	Gender	0.46	0.50	0	1	0.03	-0.05	-0.61	-0.01	-0.01	-3.01	0.00
11	Age	44.75	11.40	17	98	-1.43	0.23	54.26	5.67	-0.21	55.50	-0.29
12	Vocational education	0.13	0.34	0	1	-0.01	0.01	-0.12	-0.07	0.01	-0.95	0.00
13	Polytechnic education	0.56	0.50	0	1	0.03	0.00	0.37	0.01	0.00	-1.24	0.00
14	University education	0.23	0.42	0	1	-0.02	0.00	-0.26	0.07	-0.01	1.22	0.00
15	Doctorate	0.02	0.13	0	1	0.00	0.00	-0.03	0.01	0.00	0.74	0.00
16	Arts	0.42	0.49	0	1	0.16	0.00	0.55	0.09	-0.01	-2.40	-0.02
17	Artistic goals	0.00	0.50	-1.95	0.87	0.29	0.07	0.27	0.27	-0.03	-1.66	-0.01
18	Financial goals	0.00	1.00	-4.19	1.61	0.27	0.13	-0.79	0.05	0.03	2.58	0.06

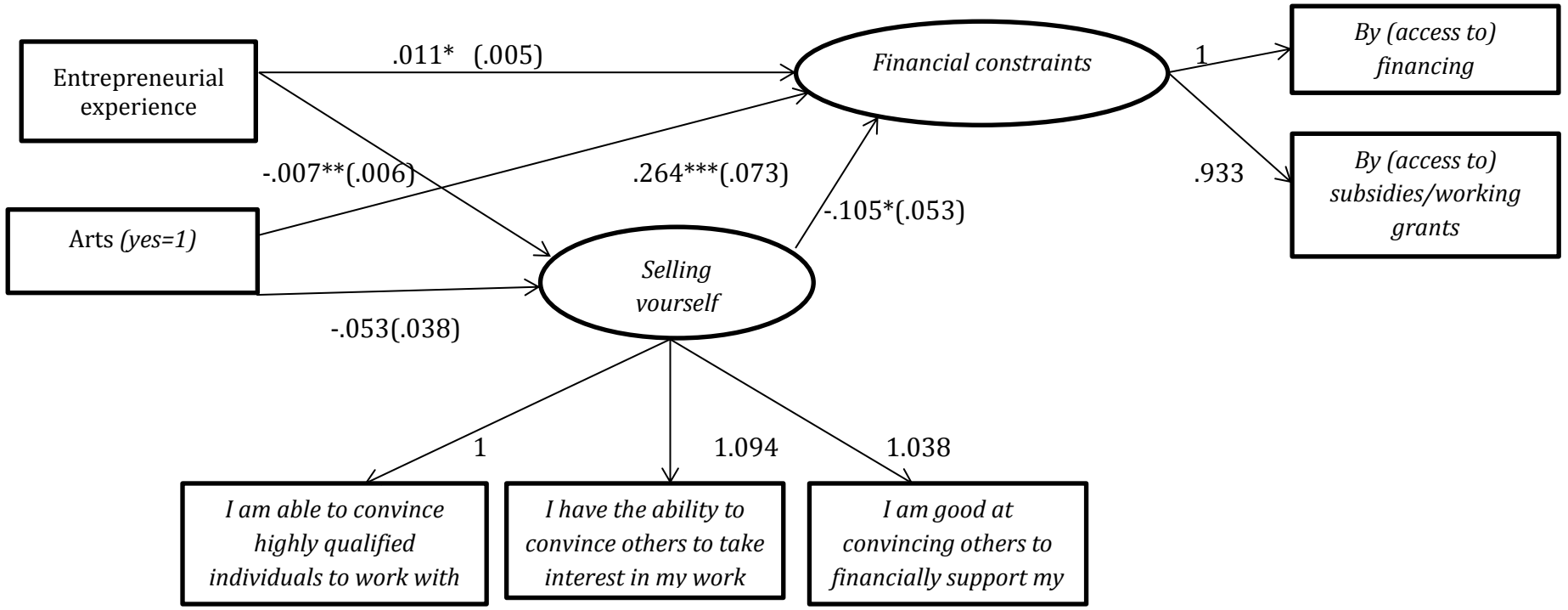
Table 2.3 – *Continued*

	Variable	8	9	10	11	12	13	14	15	16	17	18
8	Hours worked per week	238.65										
9	Export	0.94	0.22									
10	Gender	-1.41	-0.03	0.25								
11	Age	-9.81	0.24	-0.74	129.91							
12	Vocational education	0.17	-0.01	-0.02	0.19	0.11						
13	Polytechnic education	0.11	0.00	0.02	-0.10	-0.07	0.25					
14	University education	-0.42	0.00	0.01	-0.19	-0.03	-0.13	0.18				
15	Doctorate	0.00	0.00	0.00	0.07	0.00	-0.01	0.00	0.02			
16	Arts	0.45	0.03	0.00	0.16	0.00	0.02	-0.02	0.00	0.24		
17	Artistic goals	0.71	0.03	0.04	-0.05	0.00	0.03	-0.02	0.00	0.10	0.25	
18	Financial goals	1.00	0.01	0.00	-1.57	0.02	0.01	-0.01	0.00	-0.04	0.03	1.00

Table 2.4 Correlations

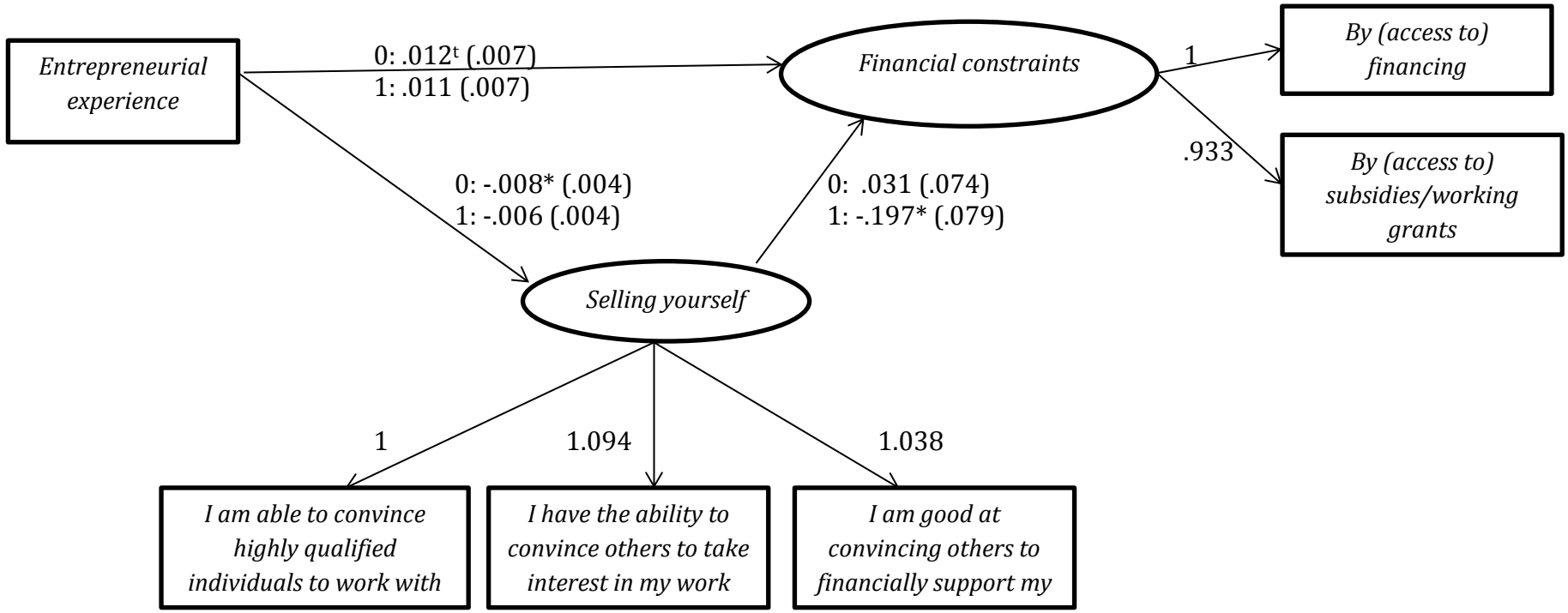
	Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	Financial constraints	1.00																	
2	Selling yourself	0.04	1.00																
3	Experience	0.03	0.00	1.00															
4	Creative personality	0.08	0.34	0.13	1.00														
5	Cost driven	0.04	-0.13	0.00	-0.08	1.00													
6	Hourly wage	-0.10	0.16	0.09	0.07	-0.08	1.00												
7	Sole income source	-0.03	0.05	0.01	0.00	-0.03	0.08	1.00											
8	Hours worked per week	0.13	0.21	0.04	0.12	-0.04	0.02	0.04	1.00										
9	Export	0.10	0.14	0.14	0.11	-0.05	0.04	0.05	0.13	1.00									
10	Gender	0.05	-0.14	-0.15	-0.01	-0.03	-0.13	0.02	-0.18	-0.12	1.00								
11	Age	-0.09	0.03	0.57	0.16	-0.04	0.10	-0.06	-0.06	0.05	-0.13	1.00							
12	Vocational education	-0.02	0.04	-0.04	-0.07	0.05	-0.06	-0.03	0.03	-0.07	-0.09	0.05	1.00						
13	Polytechnic education	0.04	-0.01	0.09	0.00	0.01	-0.05	0.01	0.01	-0.01	0.07	-0.02	-0.44	1.00					
14	University	-0.04	-0.01	-0.07	0.05	-0.06	0.06	0.02	-0.07	0.02	0.06	-0.04	-0.21	-0.62	1.00				
15	Doctorate	-0.01	0.05	-0.03	0.01	-0.05	0.12	-0.02	0.00	0.03	-0.02	0.05	-0.05	-0.15	-0.07	1.00			
16	Arts	0.24	0.01	0.13	0.06	-0.03	-0.10	-0.10	0.06	0.13	0.01	0.03	-0.02	0.10	-0.09	-0.03	1.00		
17	Artistic goals	0.43	0.19	0.06	0.18	-0.11	-0.07	-0.05	0.09	0.12	0.15	-0.01	0.02	0.13	-0.11	-0.06	0.42	1.00	
18	Financial goals	0.20	0.19	-0.10	0.02	0.05	0.05	0.13	0.06	0.03	0.00	-0.14	0.05	0.01	-0.01	-0.02	-0.08	0.06	1.00

Figure 2.1 SEM analysis self-employed in the creative industries



Included control variables: Creative personality, Artistic goals, Financial goals, Cost driven, Hourly wage, Sole income source, Hours worked per week, Export, Gender, Age, and Education.
*** p<0.001, ** p<0.01, * p<0.05, and t p<0.10.
SRMR=.031, RMSEA=.046, CFI=.916, X^2 (144)=871.702, and p<.000.

Figure 2.2 SEM multi-group analysis self-employed in the creative industries



1: Arts, 0: Other creative industries.
Included control variables: Creative personality, Artistic goals, Financial goals, Cost driven, Hourly wage, Sole income source, Hours worked per week, Export, Gender, Age, and Education.
*** p<0.001, ** p<0.01, * p<0.05, and t p<0.10.
$SRMR_{arts}$=.031, $SRMR_{other\ creative\ industries}$=.034, RMSEA=.046, CFI=.907, X^2 (283)=971.587, and p<.000.

Hence, entrepreneurs prioritizing making money and ensuring financial stability may learn more from their experiences with convincing others, as they are the ones most motivated to convince others that they are the right person to receive funding. Thus, an entrepreneur's emphasis of financial vis-à-vis artistic goals can be expected to positively moderate the relationship between *Entrepreneurial experience* and *Selling yourself*. We specified a model in which the variable *Financial goals* affects the relationship between *Entrepreneurial experience* and experienced *Financial constraints*, and the relationship between *Entrepreneurial experience* and *Selling yourself* (Preacher, Rucker, & Hayes, 2007). Unfortunately, our model failed to converge. Hence, we cannot find support for our alternative explanation.

A possible explanation for why the model failed to converge may be that both *Financial goals* and *Financial constraints* are latent variables with two items. For a latent variable to be identified on its own, it needs at least three items. If a latent variable has only two items, it is unidentified. Hence, it needs information from other latent variables in the model to be identified. However, if the correlation between these latent variables is zero or close to zero, it cannot retrieve information from the other latent variables in the model. Hence, the latent variable is unidentified. This implies that the model as a whole is unidentified and, thus, the model fails to converge.

Post hoc analysis 2

For the second post hoc analysis, we take a closer look at the scatterplots of *Entrepreneurial experience* and *Selling yourself* to see whether a pattern can be observed that may drive the negative relationship between an entrepreneur's experience and her/his ability to convince others. Figure 2.3

shows the scatterplot of *Entrepreneurial experience* and the predicted values of *Selling Yourself*. Most entrepreneurs have twenty years of experience or less. They are relatively confident in their ability to convince others. There seems to be no particular group of observations driving the negative relationship between *Entrepreneurial experience* and *Selling yourself*. Since *Selling yourself* is a latent variable calculated from scores of three items, we also computed the scatterplot for each of the three items with *Entrepreneurial experience* separately. These can be found in Figure 2.4 to 2.6.

Entrepreneurs with little experience differ more on whether they feel themselves able to convince highly-qualified individuals to work with them, to convince others to take interest in their work and to convince others to financially support their work. Still, most of these entrepreneurs agree with these statements. As their experience accumulates, they still agree to some extent that they are comfortable with convincing others to take interest in their work and with convincing highly-qualified individuals to work with them. However, they report lower confidence regarding their ability to convince others to financially support their work. When looking at the weighing scores for the calculation of *Selling yourself,* the item "I am good at convincing others to financially support my work" appears to be most important one for the calculation of *Selling yourself*. From this, we may conclude that the negative association between an entrepreneur's experience and her/his perceived ability to convince others is not driven by outliers.

Figure 2.3 Two-way scatterplot experience and selling yourself

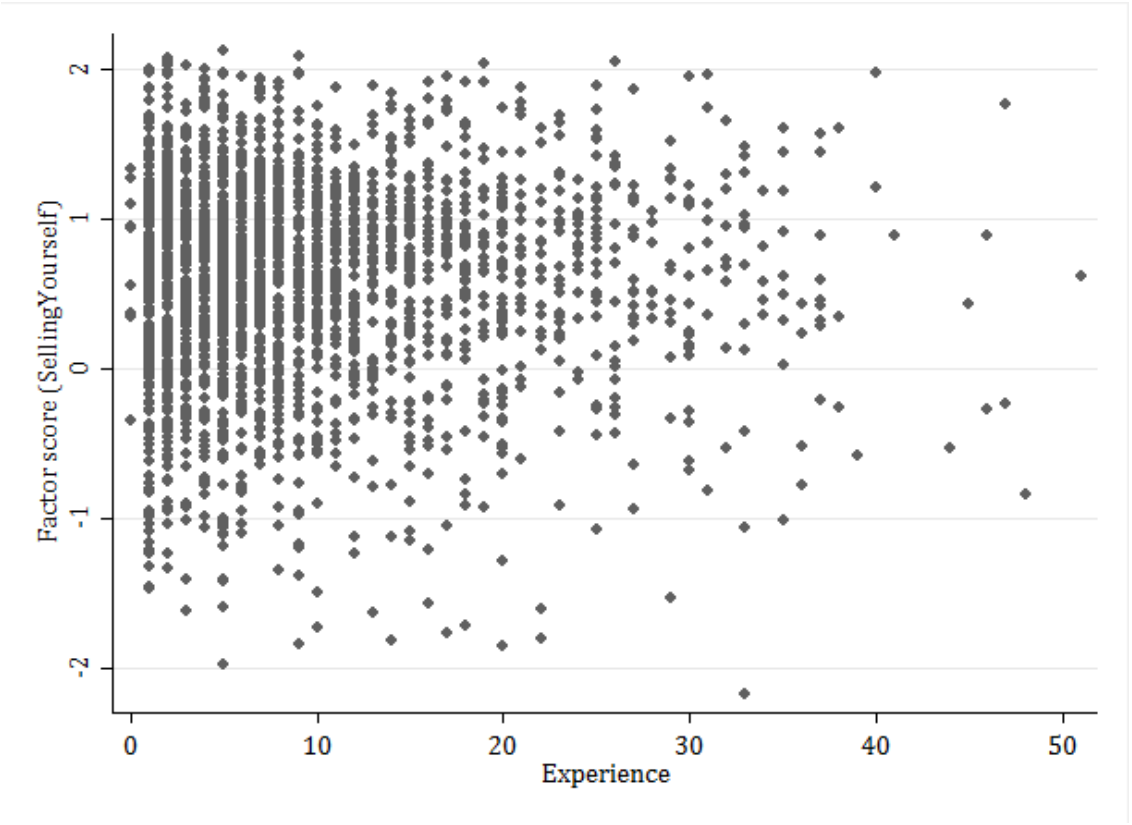


Figure 2.4 Two-way scatterplot experience and item Selling yourself

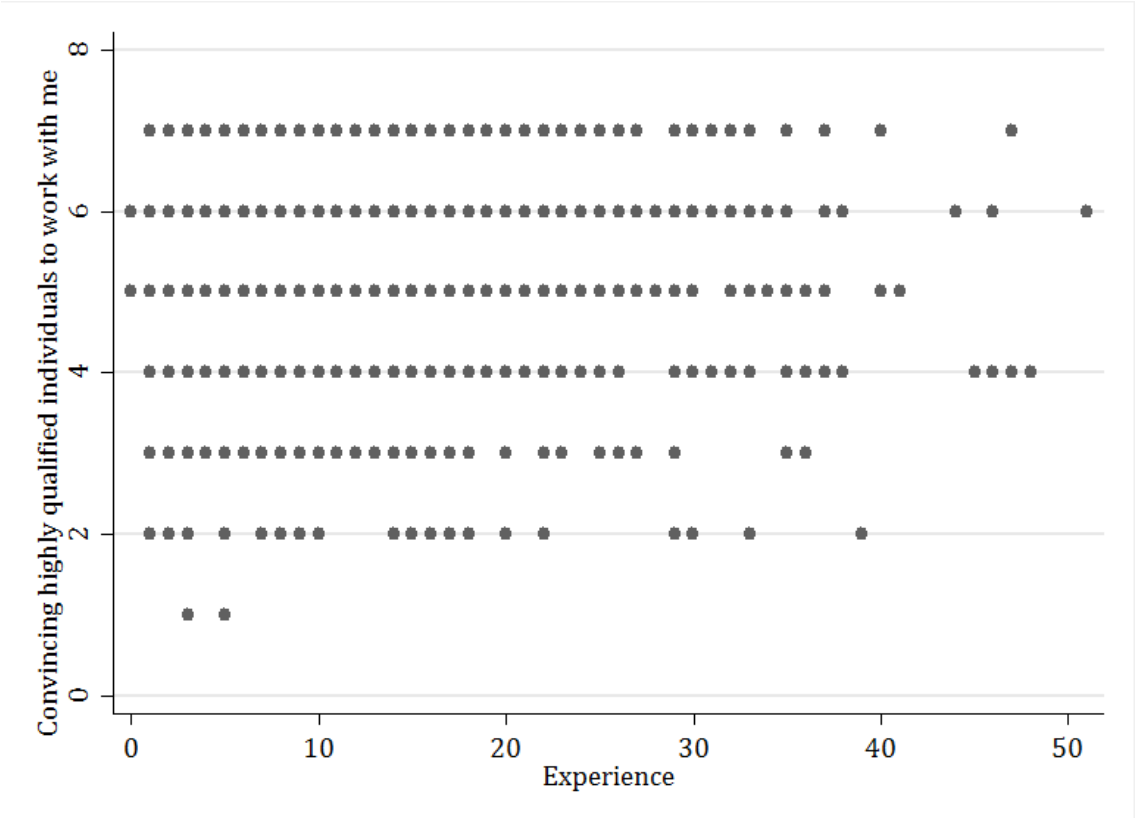


Figure 2.5 Two-way scatterplot experience and item selling yourself

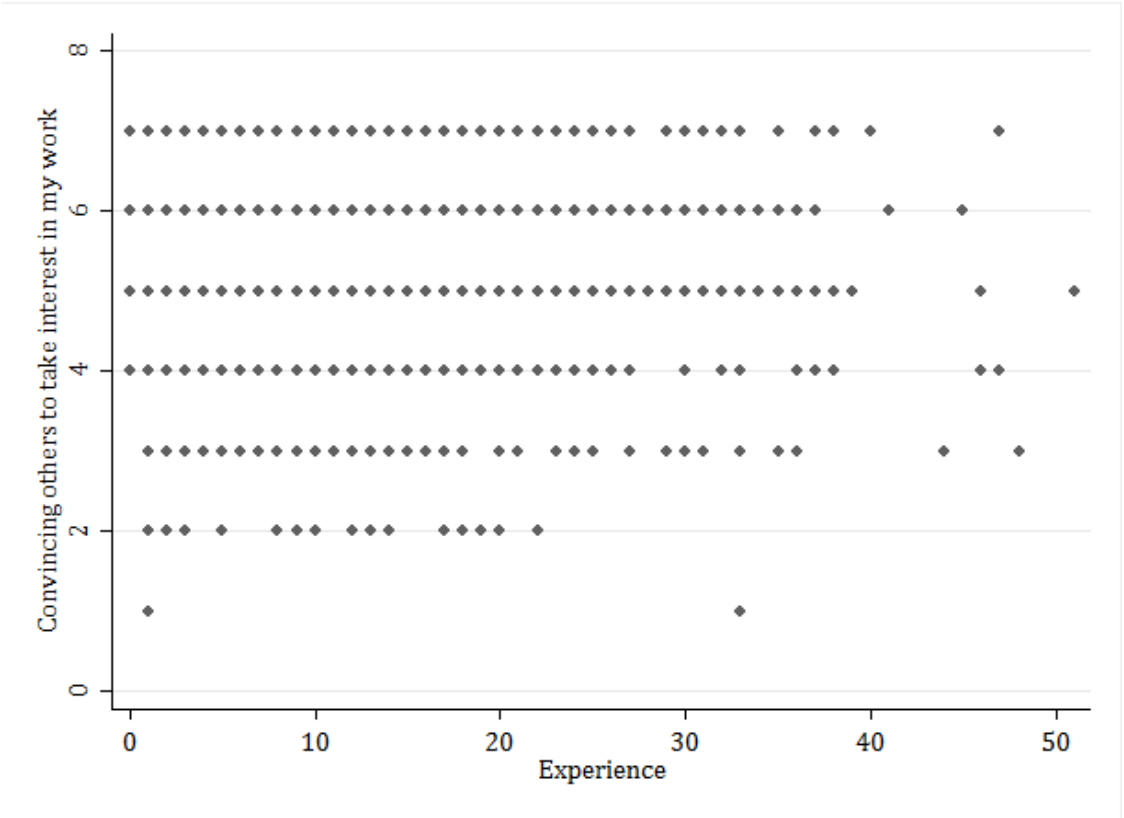
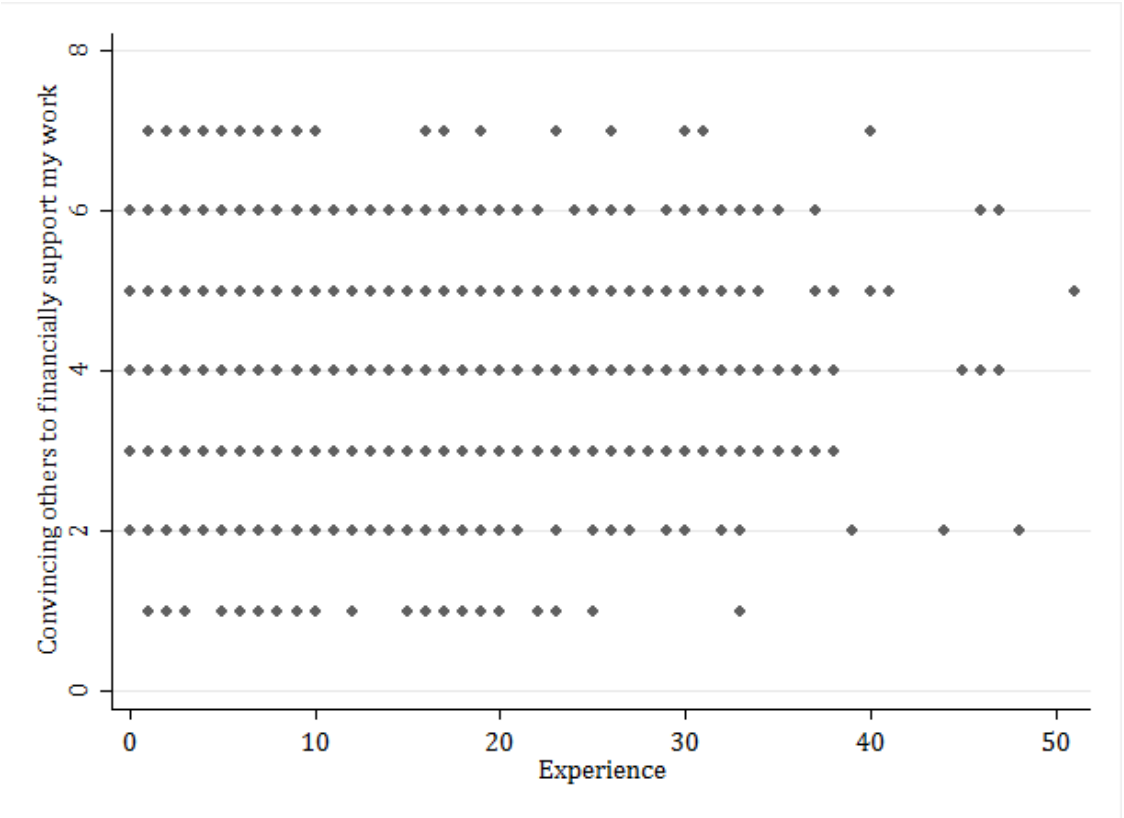


Figure 2.6 Two-way scatterplot experience and item selling yourself



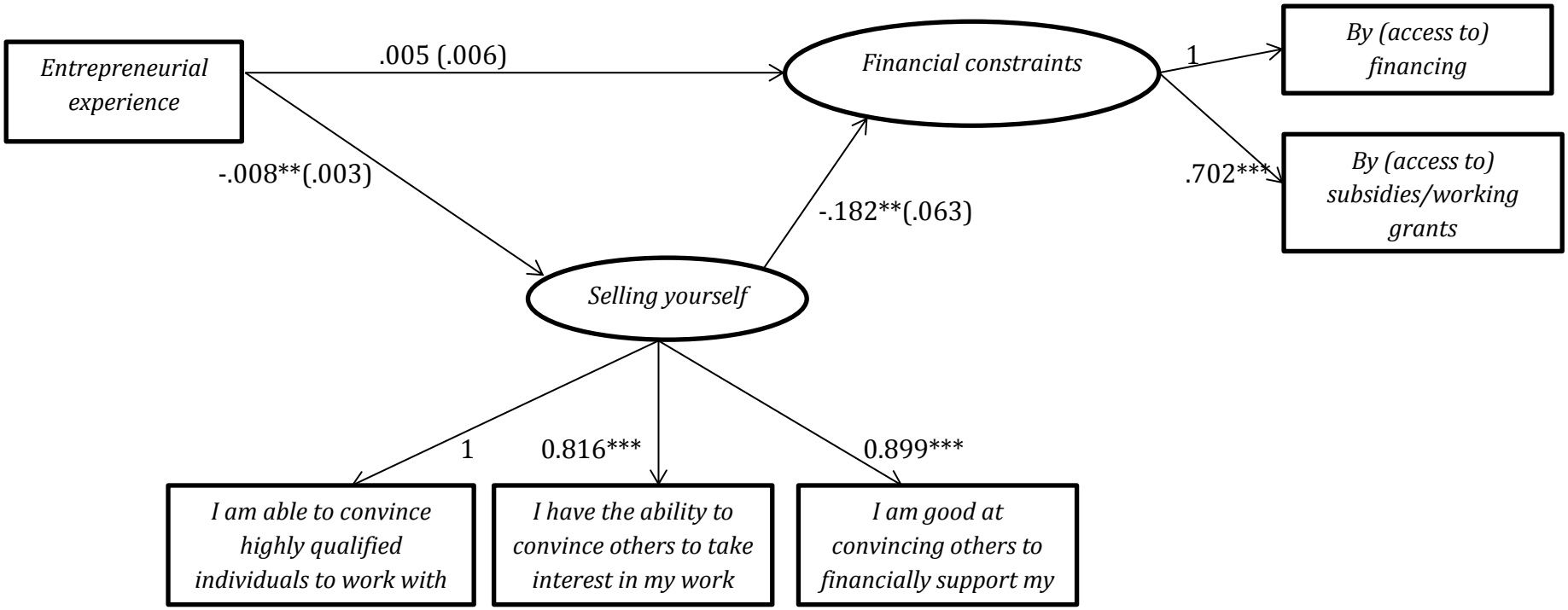
Post hoc analysis 3

For the third post hoc analysis, we examine the boundary conditions of our findings. Several scholars have argued for the importance of replication studies. This is essential to establish the reliability and validity of empirical findings (Hubbard et al., 1998). Tsang and Kwan (1999) have highlighted the importance of empirical generalization. Empirical generalizations involve a replication in a different population, using the same measurements and conducting the same analyses. Following this, we ran our first model on a second sample, which includes entrepreneurs active in other than the creative industries. By doing so, we are able to examine whether our expected relationships or unexpected findings extend to other than the creative industries.

Our sample of 'non-creative' entrepreneurs is collected with a survey (close to) identical to the instrument administered among 'creative' entrepreneurs. The survey was circulated in September and October 2015 to 431,321 organizations in the 'non-creative' industries in the Netherlands. Again, e-mail addresses were obtained via publicly available Chamber of Commerce information, using data-scraping techniques. And again, respondents were offered a personalized report in which their responses would be compared to the answers of the other respondents. Of the emails sent in this second wave, 107,043 emails were opened, of which 4,354 were completed. Respondents include both self-employed and entrepreneurs with employees. As above, we only use the survey data from self-employed. This results in a sample of 2,177 'non-creative' self-employed.

As can be seen in Figure 2.7, the factor loadings for *Selling yourself* and experienced *Financial constraints* are different in the model with non-creatives vis-à-vis those in the model with creatives. This makes sense because the nature of the two clusters of industries is different.

Figure 2.7 SEM analysis self-employed in the "non-creative" industries



Included control variables: Creative personality, Financial goals, Cost driven, Hourly wage, Sole income source, Hours worked per week, Export, Gender, Age, and Education.
*** p<0.001, ** p<0.01, * p<0.05, and t p<0.10.
SRMR=.020, RMSEA=.042, CFI=.953, X^2 (63)=309.575, and p<.000.

For example, the item "I feel constrained by (access to) subsidies/working grants" is less important for the overall experienced financial constraints in the 'non-creative' industries than in the creative industries. After all, entrepreneurs in the creative industries are relatively more dependent on governmental subsidies than their counterparts in other industries. This difference, as explained above, can be attributed to two principles characterizing the creative industries, which are the "art for art's sake" and the "nobody knows" principles (Bourdieu, 1993; Caves, 2000, 2003).

The directions of the relationships are similar to those in Figure 2.1's model. Thus, entrepreneurs with more experience consider themselves to be weaker at convincing others and experience more financial constraints. The higher an entrepreneur's perception of her/his ability to convince others, the lower her/his experienced financial constraints are. The relationship between *Selling yourself* and experienced *Financial constraints* is statistically significant at a five percent level in the model including only entrepreneurs operating in the creative industries; this relationship is highly significant in the model with entrepreneurs active in the 'non-creative' industries. In all, the unexpected findings from our sample of creative entrepreneurs are replicated in the sample with non-creatives.

Discussion

This paper explores the mediating effect of the entrepreneur's perceived ability to sell her or himself on the relationship between entrepreneurial experience and experienced financial constraints. We do so primarily in the creative industries. The literature on gatekeepers explains how creative entrepreneurs gain access to funding through positive evaluations of what they have on offer. Since gatekeepers are the ones evaluating entrepreneurs and their offerings, they play an important role in an entrepreneur's access

to financial resources. So far, literature on gatekeeping has focused on the role that gatekeepers play in selection and influencing processes. We add to this by focusing on an entrepreneurs' skills and capabilities to sell themselves to gatekeepers. In order to do so, we combine the literature on gatekeeping with the that on organizational learning, which states that an entrepreneur acquires skills and capabilities through learning-from-experience (see, for example, Cope, 2005; Minniti & Bygrave, 2001). Hence, as experience accumulates, entrepreneurs are expected to learn to sell themselves to gatekeepers, which is expected to reduce financial constraints.

Contrary to our predictions, however, the results show that as the entrepreneurial experience grows, entrepreneurs report more financial constraints. Furthermore, as entrepreneurial experience increases, entrepreneurs become weaker at selling themselves to others. This finding contradicts previous research on organizational learning. Although not explicitly hypothesized, the evidence regarding the direction of the relationship between selling yourself and experienced financial constraints is as expected: Creative self-employed who are better at convincing others experience less financial constraints. A possible explanation for these set of results may be that the total budget for subsidies to allocate over creatives is so small that the chances of a successful application are extremely low. This may lead to entrepreneurs losing confidence in their skills to successfully convince others, as then the number of failed applications is likely to increase with entrepreneurial experience.

Another possible explanation for the negative relationship between entrepreneurial experience and selling yourself, and entrepreneurial experience and experienced financial constraints, may involve the extent to which an entrepreneur has encountered failures and successes in the past.

Previous literature distinguishes between critical and non-critical learning events (Appelbaum & Goransson, 1997; Cope, 2005; Muehfeld, Rao Sahib, & van Witteloostuijn, 2012). Non-critical learning events, including successes, tend to be taken for granted. Critical learning events include mistakes and failures – i.e., having a subsidy application rejected, or a business going bankrupt. These critical learning events force entrepreneurs to rethink their actions and, therefore, result in higher-level learning. In contrast, non-critical learning events do not force entrepreneurs to evaluate their actions critically and, therefore, are associated with lower-level or even absence of learning.

A creative entrepreneur may have successfully convinced a gatekeeper, or may have successfully applied for a grant or subsidy, without knowing the exact reasons for this success. Due to so-called causal ambiguity, an entrepreneur may draw wrong inferences, incorrectly believing s/he has fully understood the causal relationships associated with a rare strategic action, event or outcome (Zollo, 2009). Drawing wrong inferences, while believing they are right, will lower the chance of a successful fund application in the future. When an entrepreneur does not know what caused her/his past success, s/he is more likely to make mistakes. However, entrepreneurs who have experienced failures, may have learned more from their experiences, since they were forced to rethink their past actions. Hence, they may suffer less from causal ambiguity and wrong inference than entrepreneurs with success experiences. Since our data are silent about whether an entrepreneur experienced successes or failures in the past, we cannot identify the potentially contrasting effects these non-critical versus critical events. This mixed bag of experiences may result in the insignificant relationship between the self-perceived "selling yourself" abilities and experienced

financial constraints.

Our negative result that more experience is associated with more financial constraints is related to the finding reported by Frankish, Roberts, Coad, Spears and Storey (2013), testing whether entrepreneurs do or do not learn. Their results show that it is difficult to tell whether entrepreneurs do learn or not as experience does not clearly result in improved performance. Another explanation for the negative effect of experience may be that entrepreneurs with many successful experiences may develop overconfidence with respect to their skills to convince others, resulting in a decreasing success of acquiring financing and increasing financial constraints (Koellinger, Minniti, & Schade, 2007). Moreover, the negative relationship between experience and financial constraints may be explained by the policies of governments. Governments may want to distribute funding equally amongst all applicants. Hence, they may be unwilling to finance the same entrepreneur repeatedly.

The negative relationship between experience and *Selling yourself* may be explained by the way in which respondents interpreted the items. The items of *Selling yourself* may be seen as quite negative by the respondents. That is, entrepreneurs may want to score low on these items as they may argue that they can survive on their own and do not need any help from others.

The mediating effect is expected to be stronger for entrepreneurs in arts than for entrepreneurs in the periphery of the creative industries. Although entrepreneurs in the arts experience more financial constraints than entrepreneurs in the periphery of the creative industries, as expected, the mediating effect of selling yourself on the relationship between entrepreneurial experience and experienced financial constraints was not found to be stronger for entrepreneurs in the arts. Actually, the insignificant

effect of the arts dummy as an indicator variable does indicate that entrepreneurs in the arts do not differ that much from their counterparts in the periphery of the creative industries. A possible explanation may be that the differences between the core and the periphery of the creative industries are not that clear-cut. For example, a moviemaker creating artistic films may be more dependent on external funding than a professional sports photographer, while the former is in the periphery and the latter in the core of the creative industries. Hence, the boundaries separating the core of the creative industries from the periphery may be quite fuzzy in reality.

One of this study's limitations is that we used cross-sectional data. We theorized that the better one is at selling her/himself the less will be the experienced financial constraints. However, we may have reversed causality here, with experienced financial constraints influencing how good an entrepreneur thinks s/he is at selling her/himself. To answer this question, longitudinal data is needed. Future research may shed more light on the direction of causality between selling yourself and experienced financial constraints. Another limitation is our measure of experience. This measure of experience does not take into account that some entrepreneurs may have had multiple ventures (that may have failed) before starting their current enterprise. Our sample only considers those entrepreneurs that have successfully set up a business, but does not reveal whether they have had multiple businesses that failed before setting up their current venture. Hence, perhaps the entrepreneurs in our sample have more entrepreneurial experience that captured by our measure.

Furthermore, our measure of financial constraints is subjective – or rather, perceptual. That is, we ask to what extent respondents feel constrained by lack of access to subsidies, working grants and financing.

However, some entrepreneurs may have a higher need for money than others. If both entrepreneurs would receive the same amount of funding, the perceived financial constraints of the entrepreneur with a higher need for money will be larger than the perceived financial constraints of the entrepreneur with a lower need for money. Entrepreneurs with a lower need for money may feel less need to sell themselves than the ones with a higher need for money. To control for the extent to which our results are biased by the effort entrepreneurs actually make to convince others and the extent to which they experience financial constraints, we would need measures on both the objective financial constraint (i.e., the amount of funding requested and received), and the subjective financial constraint. Unfortunately, we do not have data on the amount of funding requested and the amount of funding received. Future research may shed more light on this.

Another issue relates to the measure of "selling yourself". "Selling yourself" measures how good entrepreneurs indicate they are at convincing others; it does not measure their actual achievements in situations in which they had to convince others. An entrepreneur may believe her/himself to be excellent in selling her/himself to others. However, s/he may come across as arrogant to gatekeepers, while this is not her/his intentions. Hence, perception may well deviate from reality. Nevertheless, we would argue that it is unlikely that an entrepreneur will say s/he is excellent in selling her/himself to others, while s/he actually is not. This is because an entrepreneur who is poor at selling her/himself to others is likely to be unable to convince gatekeepers that s/he deserves positive evaluations. Thus, although there may not be a perfect match between how good an entrepreneur is at selling her/himself and how good s/he says s/he is, it is unlikely that there will be a large difference between the two.

Chapter 3

The entrepreneur's experiential diversity and entrepreneurial performance[2]

A panel study of self-employed in the US, 1979-2010

Abstract

This study examines the relationship between the entrepreneur's experiential diversity and entrepreneurial performance. First, we argue that entrepreneurial and industry experience are positively associated with performance. Second, by combining Lazear's jacks-of all-trades theory with the cognition and learning literatures, an inverted U-shaped experience diversity-performance relationship is predicted. We find that industry experience is positively associated with performance, but entrepreneurial experience is negatively related. Moreover, we fail to find a significant relationship between experience diversity and performance, when we do not control for industries but do depreciate for experience. However, when not depreciating for experience, with or without controlling for industries,

[2] An earlier version of this chapter is published in Small Business Economics (Spanjer & van Witteloostuijn, 2017).

experience diversity measured in terms of skills is found to have an inverted-U shaped relationship with performance. Entrepreneurs with 23 different skills have the highest performance. Furthermore, when depreciating for experience and controlling for industries, experience diversity measured in terms of both skills and knowledge is found to be positively related to performance.

Introduction

Over the past decade, much work has been done attempting to identify the reasons as to why some individuals become an entrepreneur and why some of these individuals are better in being an entrepreneur than others (Noorderhaven, Thurik, Wennekers, & van Stel, 2004; Verheul, Wennekers, Audretsch, & Thurik, 2002). Several studies relate to the economy as a whole, focusing on factors that push and pull an individual into entrepreneurship (Parker, 2004). Other research examines the effect of an individual's experience with colleagues and parents being entrepreneurs (Nanda & Sørensen, 2010). Lazear's (2005) jacks-of-all-trades theory identifies another reason for an individual to make the switch to entrepreneurship. In this theory, the central argument is that the more diverse experience gained in paid employment, the more likely this individual is to become an entrepreneur. Since an entrepreneur needs to perform many different tasks, she needs to have diverse knowledge and skills. Much of this required knowledge and skills develops from experience. Furthermore, the jacks-of-all-trades theory claims that an entrepreneur's performance is determined by her weakest skill (Lazear 2005: 655). Empirical evidence has been reported by Åstebro and Thompson (2011), Åstebro and Yong (2016), Bublitz and Noseleit (2014) and Hartog et al. (2010).

The contribution of the current paper is twofold. First, our study adds to the literature by examining the boundary conditions of the jacks-of-all-trades theory. In order to do so, this paper combines the learning literature and the literature on human cognition with that regarding the jacks-of-all-trades theory. Jacks-of-all-trades studies have focused on the effect of an entrepreneur's balanced skill set on the probability of becoming an entrepreneur, as well as her success as an entrepreneur. However, according to cognition and learning literatures, an entrepreneur is constrained in the number of skills she can develop and maintain well, due to her cognitive limitations (Baron, 1998; Gilbert, McNulty, Giuliano, & Benson, 1992). This negative effect to experience diversity on performance is found by Åstebro and Thompson (2011) and Åstebro and Yong (2016), studying whether experiential diversity has a negative or a positive effect. However, the positive findings of experiential diversity on performance reported by Bublitz and Noseleit (2014) and Hartog et al. (2010) and the negative findings of experiential diversity found by Åstebro and Thompson (2011) suggest an optimal degree of experiential diversity. Hence, instead of studying the effect of a balanced skill set on entrepreneurial performance, this study is the first to examine a non-linear relationship between skill diversity and entrepreneurial performance. Hence, what degree of diversity of a skill set is associated with the highest entrepreneurial performance?

Second, by combining a 1979-2010 US dataset, capturing the individuals' career from the start of their working life, with the O*NET occupational classification, we can determine an individual's skills and knowledge sets, and follow their development over time. This study's dataset comprises the skill types and knowledge domains in which an individual has cumulated experience, and when this was the case. Extant

jacks-of-all-trades work studying the effect of experience diversity on entrepreneurial performance either uses skills possessed before the start of the entrepreneur's career (Hartog et al., 2010), or number of different occupational fields and industries an entrepreneur has experience in (Åstebro, Chen, & Thompson, 2011; Åstebro & Yong, 2016). The former neglects the knowledge and skills learned during an individual's working life, whereas the latter ignores the possible synergies between different occupational fields and industries. We add to this by creating time-varying measures in which we unpack the number of occupations into the skill and knowledge sets gained in these occupations. We estimate the optimal number of skills and knowledge domains associated with the highest entrepreneurial performance. By doing so, we further open the black box of experience.

This paper adopts Lechmann and Schnabel's (2014) focus on the self-employed as solitude entrepreneurs. The self-employed provide an ideal context to test the jacks-of-all-trades theory, because such solo-entrepreneurs are not able to delegate any activities and tasks to employees, having none. Although self-employed have the possibility to outsource activities and tasks, this effect is limited because essential activities and tasks for entrepreneurs, such as opportunity seeking and opportunity seizing (Shane & Venkataraman 2000; Sternberg & Wennekers 2005), cannot be outsourced easily, or not at all.

Theoretical background and hypotheses

Learning from experience

The strand of literature concerned with entrepreneurial learning tries to answer three questions (Cope, 2005; Parker, 2006a). The first question is about <u>what</u> entrepreneurs learn. According to Minniti and Bygrave (2001),

knowledge is cumulative. Hence, knowledge acquired in the present builds upon knowledge learned in the past. Entrepreneurs rely heavily on their knowledge gained from previous experiences when making strategic decisions (Fern, Cardinal, & O'Neill, 2012). They need to possess two types of knowledge to be able to make entrepreneurial decisions efficiently and effectively (Minniti & Bygrave, 2001). The first type is about the market and market opportunities, and the second type refers to the entrepreneurial skills and abilities an entrepreneur needs to be able to run a business. This view is shared by Unger et al. (2011), arguing that knowledge relating to managerial and industry experience is more important to perform entrepreneurial tasks efficiently and effectively than is more general knowledge. Industry and managerial experience have slightly different effects on the choices an entrepreneur makes (Dencker & Gruber, 2015). Entrepreneurs with industry experience are more likely to stick with what they know, and thus stay in the same industry as before they became entrepreneur. Managerial experience broadens the scope of potential opportunities entrepreneurs can exploit. Managerial experience may give an entrepreneur greater benefits than industry experience, as the former operates less as a constraint on an entrepreneur's decision making (Dencker & Gruber, 2015).

Literature on learning finds that knowledge and skills are both outcomes from experience, in which knowledge relates to the "relatively formal and established facts, rules, policies and procedures" (Nass 1994: 39) and skills refer to "information-processing abilities gained from learning by doing and the ability to generate new procedures and conclusions" (Nass 1994: 40). Yet, there remains some discussion on what the outcome of experience is (Levitt & March, 1988; Minniti & Bygrave, 2001; Nass, 1994; Unger et al., 2011). Some scholars have mainly

emphasize skills as the outcome of experience (see, for example, Levitt and March 1988), whilst others primarily focus on knowledge as the outcome of experience (see, e.g., Minniti and Bygrave 2001; Nass 1994).

The second question involves how entrepreneurs learn. The argument made by several scholars is that entrepreneurs learn primarily through learning-by-doing (Cope & Watts 2000; Minniti & Bygrave 2001). Learning-by-doing includes several learning processes, of which the most important one is repetitious processes of trial and error (Nicholls-Nixon, Cooper, & Woo, 2000). Both Dalley and Hamilton (2000) and Minniti and Bygrave (2001) develop the argument that the only way in which an entrepreneur can learn is through learning-by-doing. Hence, entrepreneurs can only acquire their knowledge from experience with their own past actions. Dalley and Hamilton (2000: 55) even go as far as to argue that "there can never be any substitute for experience." Other learning processes put forward in the literature concern problem-solving and discovery (Young & Sexton, 1997). Gibb (1997) distinguishes between seven modes of learning: learning from peers, learning-by-doing, learning from feedback from customers and suppliers, learning-by-copying, learning-by-experimenting, learning-by-problem solving and opportunity taking, and learning from mistakes.

Within the context of experiential learning, the literature differentiates between the degrees to which an event offers the opportunity to learn. So-called critical events trigger higher-level learning (Appelbaum & Goransson, 1997; Cope, 2005). These critical events include crises, failures or mistakes. A key characteristic of these critical events is that they force the entrepreneur to change routines and standardized responses, as the event is non-standard and developed routines no longer prove to be valid and effective (Appelbaum & Goransson, 1997). The central argument

is that entrepreneurs learn more from critical events than from non-critical experiences, because these non-critical experiences do not force the entrepreneur to rethink routines and standardized approaches. Therefore, these non-critical experiences are argued to stimulate lower-level learning only (Cope 2005).

Other terms used in the literature for the different levels of learning are zero learning, single-loop learning, double-loop learning, and triple-loop learning (Argyris, 1996; Argyris & Schön, 1978; Romme & van Witteloostuijn, 1999). Zero learning is the lowest level of learning. Though problems arise, no corrective actions are taken. Single-loop learning involves changes of the entrepreneur's knowledge, but does not trigger the adaptation of policies and / or objectives. This level of learning relates to the question: "are we doing things right?" With double-loop learning, the detected mistakes require corrective actions that change the policies and objectives of an entrepreneur. This level of learning involves the question: "are we doing the right things?" Triple-loop learning is the highest level of learning, in which learning and detected mistakes lead an entrepreneur to change learning strategies and develop new learning processes (Romme & van Witteloostuijn, 1999).

Although an entrepreneur may learn the most from failure, failure to succeed sends out negative signals to an entrepreneur's environment, which reduces the likelihood that she will receive funding to start a new business in the future (Gompers, Kovner, Lerner, & Scharfstein, 2010; Hsu, 2007). Hsu (2007) hypothesizes that entrepreneurs who have failed might have more difficulty in obtaining funding, because of the negative signal that prior failure gives to the potential funders. Entrepreneurs with prior success, in contrast, have more success in obtaining funding. Furthermore, they have a larger network of (potential) funders. Gompers et al. (2010)

find similar results, showing that entrepreneurs with a track record of successes have an increased likelihood to receive the needed resources vis-à-vis entrepreneurs who have failed in the past.

The third question is why entrepreneurs learn. Baum et al. (2011) show that entrepreneurial learning will increase entrepreneurial performance. Cressy (1992) argues that this relationship between entrepreneurial learning and increased performance is a result of an increased understanding of the causal effects running from certain actions to specific outcomes. Parker (2006) reveals that when entrepreneurs have to decide on a future project, they value knowledge from past experience from failures and successes more highly than knowledge gained from signals and information revealed through the market and the environment.

By providing answers to these three questions, the literature on entrepreneurial learning identifies a three-step mechanism. The question as to how entrepreneurs learn relates to the causal relationship between experience and learning (Cope, 2005; Minniti & Bygrave, 2001). Subsequently, entrepreneurs are assumed and theorized to develop knowledge and capabilities through learning (Rae & Carswell, 2000). Hence, this reflects the causal relationship between learning and capabilities. The question of why entrepreneurs learn reflects the causal relationship between capabilities and performance. Indeed, Baum et al. (2011) have shown that learning results in higher entrepreneurial performance.

Hypothesis 1 (H1): *The entrepreneur's experience is positively related to entrepreneurial performance.*

Experience diversity

According to Lazear's theory of jacks-of-all-trades, entrepreneurs should have a basic level of knowledge regarding many different business areas

(Lazear, 2004, 2005). The reason for this is that an entrepreneur performs many different tasks. Thus, the entrepreneur needs many different capabilities to be able to perform all these different tasks, implying that she must have widespread experience across different business areas. Specifically, Lazear (2005) argues that the higher the experience diversity gained before becoming an entrepreneur, the larger the number of capabilities that the to-be-entrepreneur possesses and, thus, the more likely this individual is to become an entrepreneur. Furthermore, he highlights the difference between being a salary worker and being an entrepreneur. An individual in paid employment receives the income associated with her best skill. However, if this individual were to be an entrepreneur, she will be limited by her weakest skill. Therefore, an entrepreneur's weakest skill determines her success.

Following this line of reasoning, Lazear (2005) argues that there is no use for entrepreneurs to develop expert skills in one area, while having only basic skills in another area. The reason for this is that, according to the jacks-of-all-trades theory, the weakest skill determines the success of an entrepreneur. Hence, an entrepreneur should be relatively good, or relatively bad, in all required skills. When these required skills are correlated, obtaining a high level on all of these required skills is easier (Lazear, 2005). However, when these skills are not correlated, it becomes much more difficult, if not impossible, to obtain a high level on all of these required skills. This lowers the entrepreneur's chances of turning successful, given that the weakest skill determines the entrepreneur's success (Lazear, 2005).

Wagner (2006) is the first to empirically test Lazear's jacks-of-all-trades theory. Using German data, he shows that individuals with diverse experience are indeed more likely to become an entrepreneur than

individuals who do not have diverse experience. Lechmann and Schnabel (2014) find empirical support for Lazear's (2005) jacks-of-all-trades theory for a sample of self-employed. Their findings show that entrepreneurs do indeed perform many different tasks, with entrepreneurs performing more tasks than individuals in paid employment. In contrast to Lazear's (2005) argument, Lechmann and Schnabel (2014) reveal that just possessing a basic level of each required skill is insufficient. An individual should have expert skills on all of these different areas, rather than a just basic understanding. Lechmann and Schnabel (2014) explain this finding by arguing that self-employed cannot delegate tasks to the employees, having none. So, these self-employed have to perform these tasks themselves. To be able to do so, they need expert skills. Although it could be argued that self-employed have the possibility to outsource activities and tasks, the options to do so are limited. Vital activities for entrepreneurs, such as opportunity-seeking and opportunity-seizing (Shane & Venkataraman 2000; Sternberg & Wennekers 2005), cannot be outsourced.

In contrast to Lechmann and Schnabel (2014), Hartog et al. (2010) find mixed support for Lazear's jacks-of-all-trades theory. Instead of measuring the effect of experience diversity on the likelihood of becoming an entrepreneur and entrepreneurial performance, Hartog et al. (2010) measure the effect of skill diversity at the start of someone's working life on the likelihood of becoming an entrepreneur and entrepreneurial performance. In their study, five types of skills are included – i.e., verbal, mathematical, technical, clerical and social skills. The results show that skill diversity does not influence the likelihood to become an entrepreneur. However, skill diversity does affect entrepreneurial performance. Entrepreneurs with a larger number of the different skills have higher income. Skill diversity does not influence the earnings of an individual in

paid employment.

Contrary to Hartog et al. (2010) and in line with Lechmann and Schnabel (2014) and Lazear (2005), Åstebro and Thompson (2011) find evidence of individuals with more diverse experience to be more likely to become entrepreneur. However, they find mixed support for the effect of having diverse experience on entrepreneurial performance. Whereas Åstebro and Thompson (2011) report negative effects, Åstebro and Yong (2016) find mixed results. In the latter study, experience diversity measured as the number of occupational fields has a positive effect on entrepreneurial performance, but experience diversity measured as the number of industries has a negative impact on the entrepreneur's performance.

The argument made by Lazear (2005) and the evidence reported by Hartog et al. (2010) Lechmann and Schnabel (2014) and Åstebro and Yong (2016) are in line with the literature on entrepreneurial learning. Just like Lazear (2005), Minniti and Bygrave (2001) and Unger et al. (2011) argue that an entrepreneur should have knowledge regarding different areas of expertise (i.e., general knowledge, managerial knowledge, and industry knowledge) to be able to run a profitable business. And just like Lazear (2005), Minniti and Bygrave (2001) and Unger et al. (2011) reason that the knowledge an entrepreneur should possess is to be gained and learned through experience, which implies that the entrepreneur must have diverse experience to develop the required knowledge across different areas of expertise.

Hence, on the one hand, we may have a positive relationship between experience diversity and entrepreneurial performance, stemming from the learning opportunities associated with each new experience. With each new experience, the entrepreneur gains new knowledge and skills through

learning-by-doing. This results in newly developed entrepreneurial capabilities, which will ultimately result in higher entrepreneurial performance. On the other hand, we may have a negative relationship between experience diversity and entrepreneurial performance, as was found by Åstebro and Thompson (2011) and Åstebro and Yong (2016), for different reasons.

One reason follows from limited comparability of diverse experiences gained in past jobs. As the experience set gets more diverse, it becomes more difficult to compare the different experiences. Then, drawing inferences from what was learned from these different experiences is harder. If an entrepreneur cannot understand the causal relationships between her experiences and specific outcomes, it is impossible for her to fully utilize the gained capabilities (Reed & Defillippi, 1990), which lowers her entrepreneurial performance. With causal ambiguity, drawing correct inferences from what was the origin of the outcomes of the experiences of the entrepreneur is very difficult, if not impossible. Drawing wrong inferences, while believing these are right, comes with lower performance. Zollo (2009) shows that superstitious learning from rare strategic actions results in lower performance, arguing that, due to causal ambiguity, one draws wrong inferences whilst believing the opposite. Related to this, Åstebro and Yong (2016) find evidence that entrepreneurs who have experience in a wide variety of industries reveal lower entrepreneurial performance. They argue that having experience in a wide variety of industries comes at the cost of lower deep within-industry knowledge. The experiences within different industries are difficult to compare due to the idiosyncrasies of a specific industry, such as customer problems, new technologies, ways to serve the market, et cetera. Hence, this increases the likelihood of causal ambiguity due to the limited comparability across the

diverse set of experiences.

Another factor causing experience diversity to have a negative effect on performance is associated with the entrepreneur's cognitive limitations. Individuals face neurophysiological limitations "to receive, store, retrieve, and process information without error" (Williamson, 1975: 21). The cognitive capacity of an individual is exceeded when she receives more information than she is able to process. This can be understood as resulting from knowledge overload (Baron, 1998; Gilbert et al., 1992). In case of knowledge overload, the entrepreneur simply cannot process all the information, hence being unable to exploit the learning opportunities offered by experience to the fullest.

A further argument involves minimization of cognitive effort, suggesting that individuals tend to minimize their cognitive effort in the same way as they have the tendency to minimize physical effort. Mental effort is minimized by using 'short-cuts' in thinking (Baron, 1998), which would enable the entrepreneur to process more information. Both limited cognitive capacity and cognitive effort minimization reduce the understanding of the causal relationships between the entrepreneur's experiences and the corresponding outcomes. This will result in an entrepreneur being unable to fully utilize the gained capabilities, thereby lowering her entrepreneurial performance.

The negative relationship between experience diversity and entrepreneurial performance amplifies if experience diversity increases. If entrepreneurs are not aware of the errors in their knowledge and skill base, stemming from causal ambiguity and limited cognitive capacity, then new experiences are made sense of through the lens of their erroneous knowledge and skill base. This will further enlarge causal ambiguity. Hence, what once used to be small errors may grow larger as the diversity of the

knowledge and skill base increases. Combining the positive and negative relationship between experience diversity and performance, we expect that entrepreneurial performance will be low at both little and much experience diversity. This gives an inverted U-shaped relationship, implying that experiential diversity is associated with an inflection point at which entrepreneurial performance is maximal for medium levels of experience diversity.

> ***Hypothesis 2 (H2):*** *The relationship between experience diversity and this entrepreneur's performance is inverted U-shaped, such that entrepreneurs with low and high experience diversity are associated with lower performance than entrepreneurs with medium experience diversity.*

Data and methods

The data

The data are obtained from the National Longitudinal Survey of Youth performed by the US Bureau of Labor Statistics over the period 1979-2010 (NLSY79). The data involve information from 24 rounds of interviews. Respondents were interviewed annually up to 1994, and bi-annually after 1994. The data relates to 9,964 respondents aged between 14 and 22 years in 1979. Not all individuals replied to the survey in each round, making this dataset unbalanced. Moreover, not all respondents are or have been entrepreneurs. The number of individuals who are or have been entrepreneur is 1,304. The total number of observations is 2,120. The average number of year-observations per individual is 1.6, and the maximum number of year-observations per individual is 6.

The dependent variable is entrepreneurial performance. *Entrepreneurial performance* is measured as the gross annual income

obtained from wage and business income, which is measured in US dollars. This measure of performance has been adopted following van Praag et al. (2012), working with the same dataset. As the distribution of this measure is positively skewed, *Entrepreneurial performance* is expressed in logarithmic units. To not lose observations, we added 1 to the gross annual income as 260 observations had a gross annual income of zero.

The independent variables relate to the entrepreneur's experience. Regarding experiential type (H1), Minniti and Bygrave (2001) argue that entrepreneurs need two types of knowledge, namely knowledge from the industry and knowledge about being an entrepreneur. Therefore, following Minniti and Bygrave (2001), two measures of an entrepreneur's experience have been created. First, *Entrepreneurial experience* is an estimate of an individual's total number of years of experience with being an entrepreneur. This includes both the experience as an entrepreneur before the last transition to entrepreneurship, and the experience gained since the last transition to entrepreneurship. Second, *Industry experience* indicates the total number of years the entrepreneur has worked in the same industry as the current industry before becoming an entrepreneur.

The learning literature agree that experience depreciates over time: that is, experience gained recently is more important for success than experience gained longer ago (e.g., Arrazola and Hevia 2004; Arthur and Huntley 2005; Boone et al. 2008; Darr et al. 1995; Groot 1998; Madsen and Desai 2010). However, consensus is lacking regarding the depreciation rate of experience, with depreciation rates being reported that range from 67-96% per month (Argote, Beckman, & Epple, 1990; Argote & Epple, 1990; Benkard, 2000; Epple, Argote, & Murphy, 1996) to 11-17% per year (Groot, 1998). For example, Madsen and Desai (2010) show that experience from success depreciates at a higher rate than experience from failure, with 66%

and 11% per year, respectively. As we do not know whether and when the self-employed in our sample encountered failures and successes, we ran estimates using a 10%, a 20% and a 30% depreciation rate for experience. Furthermore, we run the model without depreciating for experience, implying a 0% rate.

Following Åstebro and Thompson (2011) and Lechmann and Schnabel (2014), experience diversity (H2) is measured using two proxies: the number of skills linked to an entrepreneur's past jobs (*Skill experience diversity*), and the number of knowledge fields associated with the entrepreneur's past jobs (*Knowledge experience diversity*). Although knowledge and skills are both gained from experience and, thus, are closely related, they are not the same (Nass, 1994). Hence, we include them both in this study. Data are retrieved from the Occupational Information Network Database (O*NET). This is a website developed for the US Department of Labor, Employment and Training Administration. O*NET provides job-analytic data for 1,122 occupations (SOC classified), such as required skills, knowledge fields, abilities, and tasks. Each skill and knowledge field is rated on a 1-to-5 scale according to importance. We searched for required skills and knowledge fields with a score equal or above 4. The NLSY79 data refer to 1970 SOC codes, whereas O*NET applies 2010 SOC codes. Therefore, the 2010 SOC codes were first converted to 1970 SOC codes before occupation matching.

Knowledge experience diversity is measured as the total number of unique knowledge fields associated with all past occupations, and *Skill experience diversity* as the total number of unique skills associated with all past occupations. Hence, when the skill "complex problem solving" occurs in two of the individual's past occupations, this is only counted as one skill. By doing so, we remove the possible overlap between an entrepreneur's

past occupations and account for the 'distance' that may exist between occupations. The experience of an entrepreneur is more diverse when the cumulative number of skills associated with her prior jobs is higher, or when the cumulative number of knowledge fields linked to her past jobs is higher. For both variables, as above, we ran estimates using a 10%, a 20% and a 30% depreciation rate for experience. In addition, we estimate the model without depreciating for experience.

Control variables are the *Age* of an entrepreneur, the highest obtained degree of formal *Education*, *Marital status* (1 = "married"), *Gender* (1 = "male"), *Ethnicity* (dummies for "Hispanic" and "Black", where "non-Black, non-Hispanic" is the baseline), *Limiting health* (which is 1 if the individual's health limits her in the kind of work she can do), and the average number of *Hours worked per year*. These control variables are selected in line with Dahl and Sorenson (2012), Lazear (2005), Lechmann and Schnabel (2014), van der Sluis et al. (2008), and Hartog et al. (2010). Studies have found age to have a non-linear effect on performance (Dahl & Sorenson, 2012; van der Sluis et al., 2008). Therefore, *Age* and its quadratic terms are included. We measured *Age* in years. *Education* is measured as the highest grade completed. This is an ordinal variable ranging from 1 to 20, where 1 is 1st grade and 20 is 8 or more years of college and university. Studies have established that the entrepreneur's education positively influences entrepreneurial performance (van der Sluis et al., 2008), that male entrepreneurs outperform their female counterparts (Dahl & Sorenson, 2012), that entrepreneurs belonging to an ethnic minority reveal a lower entrepreneurial performance (van der Sluis et al., 2008), and that performance is lower if an entrepreneur's health limits her in the amount of work she can do (Hartog et al. 2010; van der Sluis et al. 2008). The average number of hours worked per year is included, as some entrepreneurs work

twice as much as other entrepreneurs, which is logically linked to differences in entrepreneurial performance.

The model

To test the hypotheses, the model is estimated in three steps. First, a model is run with the control variables, and *Entrepreneurial experience* and *Industry experience* (H1). Second, the model is estimated with experience diversity measured as *Knowledge experience diversity* added, followed, third, by a model with experience diversity measured as *Skill experience diversity* added (H2). *Knowledge experience diversity* and *Skill experience diversity* are separately included in the model because of, empirically, the high correlation between the two types of experience diversity ($r = 0.95$, $p < .000$), as reported in Table 3.1. Furthermore, theoretically, the effect of knowledge experience diversity on performance is expected to be similar to that of skill experience diversity. The Hausman test indicates a preference for random effects specifications. Thus, to assess the relationship between experience diversity and entrepreneurial performance, generalized least squares random effects models are estimated.

Results

Table 3.1 presents the descriptive statistics. Approximately two-third of the entrepreneurs are male. On average, entrepreneurs cumulated 5.07 skills and 2.01 knowledge fields. The number of skills an entrepreneur possesses ranges from 0 to 45, whereas the number of knowledge fields varies from 0 to 26. None of the variables of interest are correlated above .70, except for the correlation between *Skill experience diversity* and *Knowledge experience diversity*, as discussed above. This is why these two measures of experience diversity are not included in the model at the same time.

Table 3.2 presents the estimates with *Knowledge experience diversity* as the measure for experience diversity. Column 1 shows the estimates for the baseline model including *Entrepreneurial experience* and *Industry experience* (H1), and Columns 2, 3, 4 and 5 report the estimates for the model with a 30%, depreciation rate, a 20% depreciation rate, a 10% depreciation rate and without depreciating for experience, respectively. *Knowledge experience diversity* is used as a measure for experience diversity. Similarly, Table 3.3 reports the estimates with *Skill experience diversity* as a measure for experience diversity.

Regarding H1, *Entrepreneurial experience* and *Industry experience* are insignificantly related to entrepreneurial performance. When including measures of experience diversity in the model in Columns 2 and 3, the coefficients of *Entrepreneurial experience* and *Industry experience* do not switch signs, but continue to have an insignificant effect on entrepreneurial performance. *Entrepreneurial experience* and *Industry experience* remain insignificantly associated with entrepreneurial performance if we change the rate for which we depreciate experience. Hence, H1 is not supported.

The data partially support the second hypothesis. As can be seen in Table 3.2, we fail to find a significant relationship between *Knowledge experience diversity* and entrepreneurial performance. The coefficient of *Knowledge experience diversity* remains

insignificant when we change the rate applied to depreciate experience. In Table 3.3, we can see that experience diversity measured as *Skills experience diversity* is insignificantly related to entrepreneurial performance, except if we do not depreciate for experience. If we do not apply a depreciation rate, we find an inverted U-shaped relationship between *Skill experience diversity* and performance. The Fieller method has

Table 3.1 Descriptive statistics and correlations

	Variable	Mean	Std.Dev.	Min	Max	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
1.	ln(Income)	8.79	3.54	0	12.20	1.00													
2.	Gender *(male=1)*	0.64	0.48	0	1	0.17	1.00												
3.	Age	43.46	9.02	18	43	0.09	-0.09	1.00											
4.	Limiting health *(yes=1)*	0.08	0.27	0	1	-0.06	0.04	0.12	1.00										
5.	Marital status *(married=1)*	0.57	0.50	0	1	0.08	-0.01	0.34	0.05	1.00									
6.	Education	13.77	2.63	6	20	0.12	0.08	0.17	-0.08	0.10	1.00								
7.	Ethnicity *(Hispanic=1)*	0.16	0.37	0	1	0.06	-0.06	0.00	-0.01	-0.09	-0.21	1.00							
8.	Ethnicity *(Black=1)*	0.22	0.42	0	1	0.07	-0.02	0.10	-0.05	-0.06	0.01	-0.16	1.00						
9.	Hours worked per year	2145.51	1038.16	0	7488	0.37	0.17	0.26	0.02	0.19	0.03	-0.01	0.08	1.00					
10.	Experience self-employed *(in years)*	2.83	1.36	1	17	0.01	0.04	0.44	0.05	0.19	-0.01	0.00	0.03	0.22	1.00				
11.	Industry experience *(in years)*	0.46	1.02	1	20	0.26	0.11	0.39	0.01	0.23	0.13	-0.02	0.11	0.38	0.41	1.00			
12.	Skills experience diversity	1.37	1.17	0	46	0.19	0.12	0.20	0.01	0.09	0.22	-0.18	-0.03	0.23	0.20	0.19	1.00		
13.	Skills experience diversity2	3.24	4.33	0	2116	0.19	0.11	0.20	0.02	0.09	0.19	-0.14	-0.02	0.22	0.20	0.17	0.96	1.00	
14.	Knowledge experience diversity	2.01	3.32	0	26	0.20	0.12	0.21	0.01	0.12	0.21	-0.15	-0.03	0.24	0.18	0.21	0.92	0.93	1.00
15.	Knowledge experience diversity2	15.04	50.42	0	676	0.19	0.11	0.21	0.03	0.12	0.18	-0.12	-0.02	0.22	0.16	0.18	0.85	0.90	0.96
16.	Agriculture *(yes=1)*	0.18	0.38	0	1	0.02	0.25	0.08	0.12	0.00	-0.09	-0.07	-0.07	0.18	0.13	0.08	0.13	0.12	0.17
17.	Mining *(yes=1)*	0.01	0.08	0	1	-0.02	0.06	-0.06	-0.02	-0.02	0.01	-0.03	-0.03	-0.07	0.01	-0.06	0.00	0.03	0.02
18.	Construction *(yes=1)*	0.01	0.08	0	1	0.04	0.06	-0.04	-0.02	-0.02	0.03	-0.03	0.05	0.03	-0.02	-0.03	0.07	0.07	0.05
19.	Manufacturing *(yes=1)*	0.05	0.22	0	1	0.09	0.02	-0.03	-0.06	0.03	0.02	-0.07	0.04	0.10	-0.06	0.05	0.08	0.08	0.08
20.	Transportation *(yes=1)*	0.03	0.16	0	1	-0.01	0.08	0.02	-0.04	0.01	-0.04	0.00	-0.03	0.08	0.05	0.10	0.03	0.03	0.06
21.	Trade *(yes=1)*	0.02	0.14	0	1	0.03	0.00	0.02	0.02	0.04	-0.02	-0.06	-0.01	0.08	0.00	0.08	-0.01	-0.01	-0.02
22.	Finance *(yes=1)*	0.11	0.31	0	1	0.01	0.03	-0.12	-0.04	-0.03	-0.04	0.10	-0.02	0.04	-0.09	0.05	-0.06	-0.03	-0.02
23.	Services *(yes=1)*	0.65	0.48	0	1	-0.01	-0.25	0.00	-0.05	0.06	0.14	0.00	0.09	-0.16	-0.08	-0.04	-0.09	-0.12	-0.17
24.	Public administration *(yes=1)*	0.02	0.14	0	1	0.09	0.12	0.04	-0.04	0.13	-0.05	-0.06	0.15	0.15	0.08	0.26	0.10	0.08	0.09
25.	Work experience	12.39	5.06	0	18	0.19	-0.07	0.74	0.03	0.32	0.14	-0.08	-0.03	0.32	0.51	0.46	0.34	0.32	0.37

	Variable	15.	16.	17.	18.	19.	20.	21.	22.	23.	24.	25.
15.	Knowledge experience diversity2	1.00										
16.	Agriculture *(yes=1)*	0.13	1.00									
17.	Mining *(yes=1)*	0.05	-0.04	1.00								
18.	Construction *(yes=1)*	0.04	0.03	-0.01	1.00							
19.	Manufacturing *(yes=1)*	0.08	-0.06	-0.02	-0.02	1.00						
20.	Transportation *(yes=1)*	0.04	-0.04	-0.01	-0.01	0.13	1.00					
21.	Trade *(yes=1)*	0.00	-0.03	-0.01	-0.01	0.03	-0.02	1.00				
22.	Finance *(yes=1)*	0.01	-0.14	-0.03	-0.03	-0.02	-0.06	-0.05	1.00			
23.	Services *(yes=1)*	-0.17	-0.55	-0.11	-0.11	-0.26	-0.20	-0.11	-0.33	1.00		
24.	Public administration *(yes=1)*	0.07	-0.03	-0.01	-0.01	-0.03	0.07	-0.02	0.00	-0.07	1.00	
25.	Work experience	0.33	0.10	-0.04	-0.02	0.01	0.04	0.03	-0.06	-0.08	0.06	1.00

Table 3.2 Knowledge experience diversity

	(1) Baseline	(2) 30%	(3) 20%	(4) 10%	(5) No depreciation
Gender *(male=1)*	0.177	0.169	0.173	0.180	0.188
	(0.164)	(0.165)	(0.165)	(0.165)	(0.166)
Age	-0.111	-0.116	-0.120	-0.126	-0.144
	(0.088)	(0.088)	(0.088)	(0.089)	(0.090)
Age^2	0.002	0.002	0.002	0.002	0.002t
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Limiting health *(yes=1)*	-0.495t	-0.493t	-0.500t	-0.502t	-0.478t
	(0.278)	(0.279)	(0.279)	(0.278)	(0.278)
Marital status *(married=1)*	0.561***	0.559***	0.561***	0.560***	0.563***
	(0.161)	(0.161)	(0.161)	(0.161)	(0.161)
Education	0.179***	0.177***	0.177***	0.176***	0.178***
	(0.030)	(0.031)	(0.031)	(0.031)	(0.031)
Ethnicity *(Hispanic=1)*	0.436*	0.453*	0.445*	0.430t	0.440*
	(0.220)	(0.220)	(0.220)	(0.221)	(0.221)
Ethnicity *(Black=1)*	0.031	0.046	0.037	0.027	0.036
	(0.195)	(0.195)	(0.195)	(0.196)	(0.198)
Hours worked per year	0.001***	0.001***	0.001***	0.001***	0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Entrepreneurial experience *(in years)*	-0.054	-0.064	-0.054	-0.040	-0.020
	(0.065)	(0.100)	(0.065)	(0.036)	(0.020)
Industry experience *(in years)*	0.155	0.136	0.125	0.106	0.076
	(0.104)	(0.138)	(0.109)	(0.080)	(0.052)
Knowledge experience diversity		0.019	-0.005	0.004	0.062
		(0.091)	(0.073)	(0.054)	(0.043)
Knowledge experience $diversity^2$		0.001	0.002	0.001	-0.003
		(0.005)	(0.004)	(0.003)	(0.002)
Constant	6.082***	6.102***	6.220***	6.349***	6.535***
	(1.578)	(1.592)	(1.586)	(1.589)	(1.603)
Observations	2,120	2,120	2,120	2,120	2,120
R^2	0.071	0.072	0.072	0.072	0.072
Number of ID	1,304	1,304	1,304	1,304	1,304

Standard errors in parentheses *** p<0.001, ** p<0.01, * p<0.05, t p<0.10

been applied to check whether the optimum of the inverted U lies within the data range, and to compute the confidence interval of the optimum following Haans et al. (2015). The maximum of the inverted U is at 23.20 skills (t = 2.01, p = .023, 95% CI [18.30, 43.70]). Hence, 23 skills is the optimal number: possessing less or more than 23 skills is associated with lower entrepreneurial performance. This is also reflected in Figure 3.1, which gives the marginal effect plot of *Skill experience diversity*.

Table 3.3 Skill experience diversity[3]

	(1) Baseline	(2) 30%	(3) 20%	(4) 10%	(5) No depreciation
Gender *(male=1)*	0.177	0.169	0.176	0.183	0.208
	(0.165)	(0.165)	(0.165)	(0.166)	(0.166)
Age	-0.111	-0.115	-0.118	-0.123	-0.150t
	(0.088)	(0.088)	(0.088)	(0.089)	(0.090)
Age^2	0.002	0.002	0.002	0.002	0.002t
	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)
Limiting health *(yes=1)*	-0.495t	-0.495t	-0.501t	-0.501t	-0.471t
	(0.278)	(0.279)	(0.279)	(0.279)	(0.277)
Marital status *(married=1)*	0.561***	0.563***	0.564***	0.564***	0.574***
	(0.161)	(0.161)	(0.161)	(0.161)	(0.160)
Education	0.179***	0.177***	0.178***	0.177***	0.177***
	(0.030)	(0.031)	(0.031)	(0.031)	(0.031)
Ethnicity *(Hispanic=1)*	0.436*	0.453*	0.444*	0.428t	0.467*
	(0.220)	(0.220)	(0.220)	(0.221)	(0.221)
Ethnicity *(Black=1)*	0.031	0.045	0.034	0.024	0.022
	(0.195)	(0.195)	(0.200)	(0.197)	(0.198)
Hours worked per year	0.001***	0.001***	0.001***	0.001***	0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Entrepreneurial experience *(in years)*	-0.054	-0.066	-0.055	-0.040	-0.015
	(0.065)	(0.100)	(0.065)	(0.036)	(0.020)
Industry experience *(in years)*	0.155	0.143	0.129	0.109	0.077
	(0.104)	(0.138)	(0.108)	(0.080)	(0.052)
Skill experience diversity		-0.031	-0.110	-0.008	0.621*
		(0.422)	(0.335)	(0.255)	(0.024)
Skill experience diversity^2		0.053	0.066	0.017	-0.134**
		(0.120)	(0.096)	(0.077)	(0.050)
Constant	6.082***	6.108***	6.200***	6.299***	6.395***
	(1.579)	(1.591)	(1.583)	(1.587)	(1.601)
Observations	2,120	2,120	2,120	2,120	2,120
R^2	0.071	0.071	0.072	0.071	0.074
Number of ID	1,304	1,304	1,304	1,304	1,304

Standard errors in parentheses *** p<0.001, ** p<0.01, * p<0.05, t p<0.10

Table 3.4 and 3.5 present the estimates for the models in which we control for industry effects. We chose the industry categories following the SIC classification scheme (Occupational Safety & Health Administration, n.d.). In Table 3.4, *Knowledge experience diversity* is used as a measure for

[3] Skill experience diversity is divided by 10; otherwise, the effect would not be visible, given that we report in three decimals.

experience diversity. Table 3.5 presents the estimates with *Skill experience diversity*. Column 1 provides the estimates of the model with a 30% depreciation rate for experience, Column 2 with a 20% depreciation rate, Column 3 with a 10% depreciation rate, and Column 4 with no depreciation for experience. If we control for industry effects, a very large number of the observations is lost, due to missing values: of the 1,304 original individuals, only 375 remain. Nevertheless, the fit of the model drastically improves: whereas the model without controlling for industry effects explains about 7.2% of the variation in entrepreneurial performance, the model in which

Figure 3.1 Marginal effect of Skill experience diversity without controlling for industry

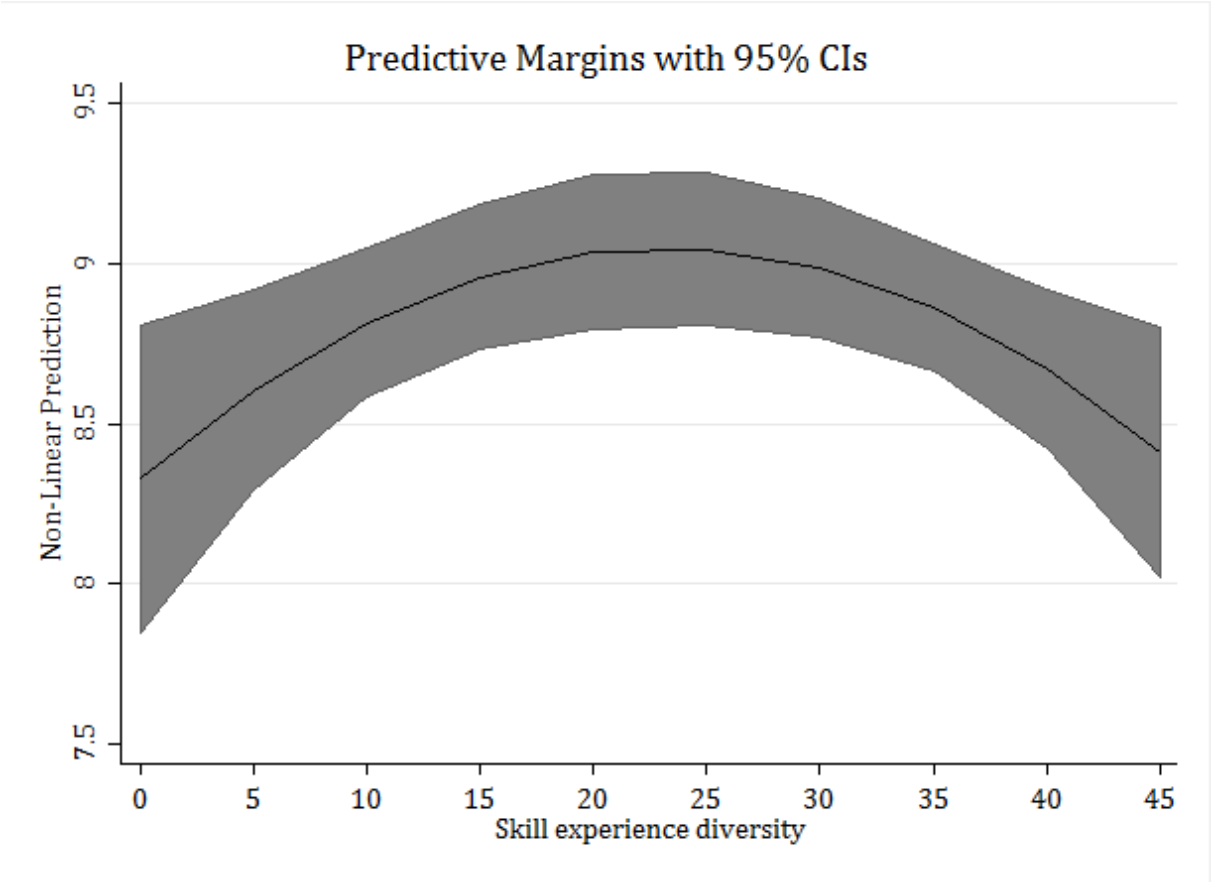


Table 3.4 Knowledge experience diversity controlling for industry

	(1) 30%	(2) 20%	(3) 10%	(4) No depreciation
Gender *(male=1)*	0.498**	0.501**	0.510**	0.555**
	(0.189)	(0.189)	(0.190)	(0.190)
Age	0.703***	0.685***	0.658***	0.641***
	(0.158)	(0.158)	(0.159)	(0.159)
Age^2	-0.012***	-0.012***	-0.011***	-0.011***
	(0.003)	(0.003)	(0.003)	(0.003)
Limiting health *(yes=1)*	-0.500	-0.498	-0.469	-0.397
	(0.359)	(0.359)	(0.360)	(0.359)
Marital status *(married=1)*	-0.079	-0.088	-0.095	-0.110
	(0.191)	(0.191)	(0.191)	(0.191)
Education	0.015	0.019	0.026	0.032
	(0.043)	(0.043)	(0.043)	(0.042)
Ethnicity *(Hispanic=1)*	0.744**	0.709**	0.665**	0.629*
	(0.255)	(0.256)	(0.258)	(0.258)
Ethnicity *(Black=1)*	0.311	0.302	0.294	0.300
	(0.263)	(0.263)	(0.265)	(0.265)
Hours worked per year	0.001***	0.001***	0.001***	0.001***
	(0.000)	(0.000)	(0.000)	(0.000)
Agriculture *(yes=1)*	-0.360	-0.311	-0.267	-0.232
	(0.365)	(0.363)	(0.361)	(0.359)
Mining *(yes=1)*	0.206	0.219	0.280	0.381
	(1.143)	(1.145)	(1.147)	(1.143)
Construction *(yes=1)*	0.603	0.683	0.773	0.809
	(1.122)	(1.124)	(1.126)	(1.125)
Manufacturing *(yes=1)*	0.277	0.362	0.469	0.532
	(0.453)	(0.450)	(0.448)	(0.445)
Transportation *(yes=1)*	-1.054t	-1.012t	-0.964t	-0.898
	(0.587)	(0.586)	(0.585)	(0.582)
Trade *(yes=1)*	-0.064	-0.027	0.025	0.066
	(0.640)	(0.640)	(0.639)	(0.635)
Finance *(yes=1)*	-0.204	-0.169	-0.108	-0.020
	(0.377)	(0.375)	(0.373)	(0.369)

Table continues on next page

Table 3.4 – *Continued*

	(1) 30%	(2) 20%	(3) 10%	(4) No depreciation
Services *(yes=1)*	0.059	0.110	0.169	0.222
	(0.335)	(0.332)	(0.329)	(0.327)
Public administration *(yes=1)*	-0.408	-0.327	-0.200	-0.092
	(0.674)	(0.670)	(0.665)	(0.658)
Entrepreneurial experience *(in years)*	-0.414**	-0.299**	-0.200**	-0.150***
	(0.144)	(0.103)	(0.070)	(0.044)
Industry experience *(in years)*	0.388***	0.313***	0.228***	0.144***
	(0.113)	(0.088)	(0.063)	(0.039)
Knowledge experience diversity	0.054	0.023	0.018	0.060
	(0.059)	(0.058)	(0.056)	(0.049)
Knowledge experience diversity^2	-0.000	0.001	0.001	-0.002
	(0.003)	(0.003)	(0.003)	(0.002)
Constant	-3.342	-3.172	-2.925	-2.891
	(2.235)	(2.242)	(2.254)	(2.252)
Observations	496	496	496	496
R^2	0.251	0.249	0.245	0.247
Number of ID	375	375	375	375

Standard errors in parentheses *** p<0.001, ** p<0.01, * p<0.05, t p<0.10

Table 3.5 Skill experience diversity controlling for industry[4]

	(1) 30%	(2) 20%	(3) 10%	(4) No depreciation
Gender *(male=1)*	0.485*	0.493**	0.508**	0.571**
	(0.189)	(0.189)	(0.189)	(0.189)
Age	0.703***	0.683***	0.652***	0.645***
	(0.158)	(0.158)	(0.159)	(0.158)
Age^2	-0.012***	-0.012***	-0.011***	-0.011***
	(0.003)	(0.003)	(0.003)	(0.003)
Limiting health *(yes=1)*	-0.514	-0.505	-0.469	-0.387
	(0.359)	(0.359)	(0.360)	(0.358)
Marital status *(married=1)*	-0.056	-0.066	-0.075	-0.089
	(0.191)	(0.191)	(0.192)	(0.190)
Education	0.016	0.020	0.027	0.034
	(0.043)	(0.043)	(0.043)	(0.043)
Ethnicity *(Hispanic=1)*	0.755**	0.714**	0.675**	0.670**
	(0.257)	(0.258)	(0.260)	(0.259)
Ethnicity *(Black=1)*	0.316	0.307	0.302	0.316
	(0.263)	(0.264)	(0.265)	(0.265)
Hours worked per year	0.001***	0.001***	0.001***	0.001***
	(0.000)	(0.000)	(0.000)	(0.000)
Agriculture *(yes=1)*	-0.353	-0.315	-0.273	-0.217
	(0.363)	(0.362)	(0.361)	(0.357)
Mining *(yes=1)*	0.193	0.214	0.314	0.510
	(1.145)	(1.147)	(1.149)	(1.139)
Construction *(yes=1)*	0.495	0.574	0.689	0.739
	(1.125)	(1.125)	(1.128)	(1.121)
Manufacturing *(yes=1)*	0.249	0.334	0.446	0.494
	(0.453)	(0.450)	(0.448)	(0.444)
Transportation *(yes=1)*	-1.032t	-0.999t	-0.950	-0.908
	(0.586)	(0.585)	(0.584)	(0.579)

Table continues on next page

[4] Skill experience diversity is divided by 10 (see footnote 3).

Table 3.5 – *Continued*

	(1) 30%	(2) 20%	(3) 10%	(4) No depreciation
Trade *(yes=1)*	-0.105	-0.053	-0.007	-0.038
	(0.640)	(0.639)	(0.639)	(0.633)
Finance *(yes=1)*	-0.211	-0.174	-0.106	-0.014
	(0.377)	(0.375)	(0.373)	(0.367)
Services *(yes=1)*	0.009	0.067	0.129	0.128
	(0.335)	(0.332)	(0.329)	(0.326)
Public administration *(yes=1)*	-0.437	-0.365	-0.240	-0.127
	(0.675)	(0.670)	(0.666)	(0.655)
Entrepreneurial experience *(in years)*	-0.434**	-0.314**	-0.207**	-0.145**
	(0.144)	(0.104)	(0.070)	(0.045)
Industry experience *(in years)*	0.399***	0.321***	0.232***	0.145***
	(0.113)	(0.088)	(0.063)	(0.039)
Skill experience diversity	0.120	0.017	0.089	0.640**
	(0.283)	(0.276)	(0.270)	(0.248)
Skill experience diversity^2	0.032	0.053	0.018	-0.134*
	(0.078)	(0.074)	(0.069)	(0.057)
Constant	-3.301	-3.115	-2.865	-3.194
	(2.236)	(2.242)	(2.258)	(2.252)
Observations	496	496	496	496
R^2	0.251	0.249	0.244	0.253
Number of ID	375	375	375	375

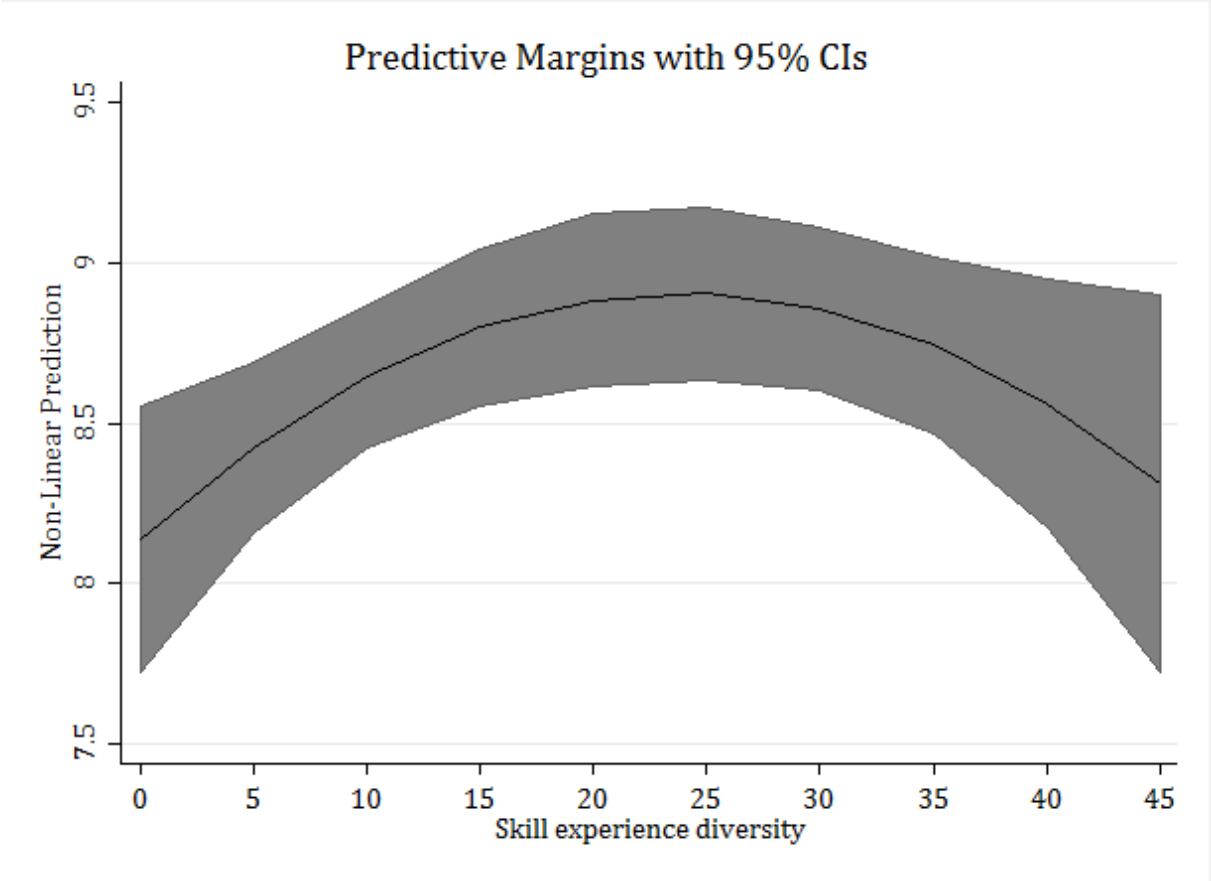
Standard errors in parentheses *** p<0.001, ** p<0.01, * p<0.05, t p<0.10

industry effects are controlled for explains about 25% of the variation in entrepreneurial performance. When controlling for industry effects, the coefficients *Industry experience* and *Entrepreneurial experience* turn significant. *Industry experience* is positively associated with entrepreneurial performance. However, *Entrepreneurial experience* is negatively related to entrepreneurial performance. The coefficients of *Industry experience* and *Entrepreneurial experience* do not switch signs, and continue to be significantly related to entrepreneurial performance when we change the measure of experience diversity or when we change the depreciation rates for experience. Therefore, when we control for industry effects, H1 is partially supported – i.e., *Industry experience* is positively related to performance, but *Entrepreneurial experience* is not.

The effects of *Knowledge experience diversity* and *Skill experience diversity* are robust. *Knowledge experience diversity* remains to have an insignificant effect on entrepreneurial performance when controlling for industry effects. We fail to find a significant relationship between *Skills experience diversity* and entrepreneurial performance if we depreciate for experience, but we do find an inverted-U shaped relationship if we do not depreciate for experience. The Fieller method indicates that the maximum of the inverted U is at 23.97 skills ($t = 2.01$, $p = .023$, 95% CI [18.30, 43.70]). Thus, 24 skills is the optimal number of skills to cumulate for an entrepreneur: possessing less or more than 24 skills is associated with lower entrepreneurial performance. Figure 3.2 shows the marginal effects of the inverted U relationship between *Skill experience diversity* and entrepreneurial performance when controlling for industry effects. To check whether the increased fit of our model is because we control for industry effects or because we run the model on a subsample, we re-estimate the model on the subsample without controlling for industry

effects. These results can be found in Appendix A1. The results show that the significance levels are similar to the significance levels in Table 3.4. The decrease in fit of the model is minimal compared to the model in Table 3.4.

Figure 3.2 Marginal effect of Skill experience diversity controlling for industry



Robustness checks

We performed several robustness checks. First, as we fail to find a non-linear relationship between experience diversity and entrepreneurial performance in most of our models, we test for a linear relationship between experience diversity and entrepreneurial performance. In the models where industry effects are not controlled for, we do not find a significant linear relationship between our measures of experience diversity and entrepreneurial performance, as can be seen in Table 3.6. In contrast, if we control for industry effects, this relationship turns

significant, as is shown in Table 3.7. *Knowledge experience diversity* is positively related to entrepreneurial performance if *Knowledge experience diversity* is depreciated at a 10% rate, 20% rate and 30% rate. If we do not depreciate for experience, we fail to find a significant relationship between *Knowledge experience diversity* and entrepreneurial performance. If experience is depreciated for, we have a positive linear relationship between *Skill experience diversity* and entrepreneurial performance. This finding is consistent across depreciation rates of 10%, 20% and 30%. To check whether the increased fit of our model and the significance of our main effects is because we control for industry effects or because we run the model on a subsample, we again re-estimate the model on the subsample without controlling for industry effects. These results can be found in Appendix A2. The results show that the significance levels are similar to the significance levels in Table 3.7. The decrease in fit of the model is minimal compared to the model in Table 3.7. Second, our results may be driven by a self-selection bias: i.e., individuals who have more diverse experiences are also the ones who are more likely to become an entrepreneur (Hsieh, 2016; Lazear, 2005; Lechmann & Schnabel, 2014). Hence, a Heckman procedure is performed. An individual's risk attitude is used as an instrumental variable, as individuals who are risk loving are more likely to become entrepreneur than individuals who are risk averse (Blanchflower & Oswald, 1998). Risk attitude is measured on a 10-point Likert scale, where 0 indicates "unwilling to take any risk" and 10 "fully prepared to take risk". Risk attitude is positively related to the likelihood to become an entrepreneur. Experience diversity is positively associated with the likelihood to become an entrepreneur if we do not depreciate for experience. If we do depreciate for experience, we do not find a significant relationship between experience diversity and the likelihood to become an

Table 3.6 Testing for a linear relationship not controlling for industry[5]

	(1) 30%	(2) 30%	(3) 20%	(4) 20%	(5) 10%	(6) 10%	(7) No depreciation	(8) No depreciation
Gender *(male=1)*	0.168	0.168	0.172	0.171	0.182	0.179	0.188	0.185
	(0.164)	(0.164)	(0.165)	(0.165)	(0.165)	(0.165)	(0.166)	(0.166)
Age	-0.114	-0.115	-0.118	-0.119	-0.123	-0.125	-0.128	-0.131
	(0.088)	(0.088)	(0.088)	(0.088)	(0.089)	(0.089)	(0.090)	(0.090)
Age^2	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Limiting health *(yes=1)*	-0.491t	-0.491t	-0.495t	-0.495t	-0.499t	-0.499t	-0.485t	-0.483t
	(0.278)	(0.278)	(0.278)	(0.278)	(0.278)	(0.278)	(0.278)	(0.278)
Marital status *(married=1)*	0.562***	0.559***	0.561***	0.558***	0.562***	0.558***	0.562***	0.560***
	(0.161)	(0.161)	(0.161)	(0.161)	(0.161)	(0.161)	(0.161)	(0.161)
Education	0.176***	0.176***	0.176***	0.176***	0.176***	0.175***	0.179***	0.178***
	(0.030)	(0.030)	(0.031)	(0.030)	(0.031)	(0.031)	(0.031)	(0.031)
Ethnicity *(Hispanic=1)*	0.455*	0.454*	0.445*	0.446*	0.427t	0.429t	0.420t	0.421t
	(0.220)	(0.220)	(0.220)	(0.220)	(0.221)	(0.220)	(0.221)	(0.221)
Ethnicity *(Black=1)*	0.048	0.048	0.042	0.043	0.027	0.030	0.014	0.019
	(0.195)	(0.195)	(0.195)	(0.195)	(0.196)	(0.196)	(0.198)	(0.197)
Hours worked per year	0.001***	0.001***	0.001***	0.001***	0.001***	0.001***	0.001***	0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Entrepreneurial experience *(in years)*	-0.065	-0.063	-0.054	-0.053	-0.041	-0.041	-0.018	-0.019
	(0.100)	(0.100)	(0.065)	(0.065)	(0.036)	(0.036)	(0.020)	(0.020)
Industry experience *(in years)*	0.136	0.132	0.129	0.124	0.112	0.108	0.077	0.077
	(0.136)	(0.136)	(0.108)	(0.108)	(0.079)	(0.079)	(0.052)	(0.052)
Knowledge experience diversity		0.037		0.028		0.016		0.003
		(0.030)		(0.028)		(0.023)		(0.012)

Table continues on next page

[5]Skill experience diversity is divided by 10 (see footnote 3).

Table 3.6 – *Continued*

	(1) 30%	(2) 30%	(3) 20%	(4) 20%	(5) 10%	(6) 10%	(7) No depreciation	(8) No depreciation
Skill experience diversity	0.147		0.104		0.045		-0.002	
	(0.132)		(0.125)		(0.104)		(0.061)	
Constant	6.040***	6.069***	6.137***	6.165***	6.282***	6.325***	6.449***	6.508***
	(1.583)	(1.584)	(1.581)	(1.581)	(1.585)	(1.586)	(1.604)	(1.604)
Observations	2,120	2,120	2,120	2,120	2,120	2,120	2,120	2,120
R^2	0.071	0.071	0.071	0.071	0.071	0.072	0.071	0.071
Number of ID	1,304	1,304	1,304	1,304	1,304	1,304	1,304	1,304

Standard errors in parentheses *** p<0.001, ** p<0.01, * p<0.05, t p<0.10

Table 3.7 Testing for a linear relationship controlling for industry[6]

	(1) 30%	(2) 30%	(3) 20%	(4) 20%	(5) 10%	(6) 10%	(7) No depreciation	(8) No depreciation
Gender *(male=1)*	0.482*	0.498**	0.492**	0.505**	0.509**	0.515**	0.538**	0.537**
	(0.189)	(0.188)	(0.189)	(0.189)	(0.189)	(0.189)	(0.189)	(0.189)
Age	0.699***	0.703***	0.677***	0.681***	0.650***	0.655***	0.645***	0.649***
	(0.158)	(0.158)	(0.158)	(0.158)	(0.158)	(0.158)	(0.159)	(0.158)
Age^2	-0.012***	-0.012***	-0.011***	-0.012***	-0.011***	-0.011***	-0.011***	-0.011***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Limiting health *(yes=1)*	-0.505	-0.500	-0.493	-0.490	-0.466	-0.464	-0.407	-0.401
	(0.358)	(0.358)	(0.358)	(0.358)	(0.359)	(0.359)	(0.360)	(0.359)
Marital status *(married=1)*	-0.051	-0.079	-0.060	-0.085	-0.074	-0.094	-0.097	-0.112
	(0.191)	(0.190)	(0.191)	(0.191)	(0.192)	(0.191)	(0.191)	(0.191)
Education	0.016	0.015	0.019	0.018	0.027	0.025	0.037	0.033
	(0.043)	(0.043)	(0.043)	(0.043)	(0.043)	(0.043)	(0.043)	(0.043)
Ethnicity *(Hispanic=1)*	0.765**	0.744**	0.734**	0.714**	0.682**	0.669**	0.616*	0.624*
	(0.255)	(0.255)	(0.257)	(0.256)	(0.258)	(0.257)	(0.259)	(0.258)
Ethnicity *(Black=1)*	0.322	0.312	0.318	0.308	0.306	0.300	0.278	0.286
	(0.262)	(0.262)	(0.263)	(0.263)	(0.265)	(0.264)	(0.266)	(0.265)
Hours worked per year	0.001***	0.001***	0.001***	0.001***	0.001***	0.001***	0.001***	0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Agriculture *(yes=1)*	-0.363	-0.360	-0.328	-0.326	-0.275	-0.275	-0.214	-0.220
	(0.362)	(0.362)	(0.361)	(0.361)	(0.360)	(0.360)	(0.359)	(0.358)
Mining *(yes=1)*	0.240	0.206	0.293	0.256	0.339	0.304	0.395	0.365
	(1.139)	(1.139)	(1.140)	(1.141)	(1.144)	(1.144)	(1.143)	(1.142)
Construction *(yes=1)*	0.488	0.603	0.572	0.675	0.689	0.767	0.804	0.843
	(1.123)	(1.121)	(1.125)	(1.122)	(1.127)	(1.125)	(1.125)	(1.123)
Manufacturing *(yes=1)*	0.245	0.277	0.329	0.360	0.444	0.465	0.546	0.553
	(0.453)	(0.452)	(0.450)	(0.449)	(0.448)	(0.447)	(0.445)	(0.444)
Transportation *(yes=1)*	-1.038t	-1.054t	-1.008t	-1.026t	-0.954	-0.973t	-0.858	-0.880
	(0.586)	(0.585)	(0.584)	(0.584)	(0.584)	(0.584)	(0.581)	(0.581)

Table continues on next page

[6] Skill experience diversity is divided by 10 (see footnote 3).

Table 3.7 – *Continued*

	(1) 30%	(2) 30%	(3) 20%	(4) 20%	(5) 10%	(6) 10%	(7) No depreciation	(8) No depreciation
Trade *(yes=1)*	-0.107	-0.064	-0.061	-0.019	-0.015	0.025	0.047	0.080
	(0.639)	(0.639)	(0.638)	(0.639)	(0.638)	(0.639)	(0.635)	(0.635)
Finance *(yes=1)*	-0.207	-0.204	-0.164	-0.163	-0.102	-0.103	-0.030	-0.027
	(0.377)	(0.377)	(0.374)	(0.374)	(0.372)	(0.372)	(0.369)	(0.368)
Services *(yes=1)*	-0.004	0.059	0.049	0.104	0.123	0.165	0.206	0.236
	(0.333)	(0.334)	(0.331)	(0.331)	(0.328)	(0.329)	(0.325)	(0.326)
Public administration *(yes=1)*	-0.451	-0.408	-0.385	-0.344	-0.247	-0.215	-0.047	-0.038
	(0.673)	(0.672)	(0.669)	(0.668)	(0.665)	(0.663)	(0.657)	(0.655)
Entrepreneurial experience *(in years)*	-0.435**	-0.414**	-0.314**	-0.301**	-0.206**	-0.200**	-0.152***	-0.152***
	(0.144)	(0.143)	(0.103)	(0.103)	(0.070)	(0.070)	(0.045)	(0.045)
Industry experience *(in years)*	0.397***	0.387***	0.319***	0.311***	0.232***	0.227***	0.146***	0.145***
	(0.113)	(0.113)	(0.088)	(0.088)	(0.063)	(0.063)	(0.039)	(0.039)
Knowledge experience diversity		0.054**		0.047**		0.035*		0.023
		(0.018)		(0.018)		(0.017)		(0.015)
Skill experience diversity	0.232**		0.206**		0.155*		0.082	
	(0.080)		(0.080)		(0.078)		(0.072)	
Constant	-3.283	-3.342	-3.096	-3.149	-2.873	-2.919	-2.924	-2.924
	(2.234)	(2.232)	(2.241)	(2.239)	(2.255)	(2.252)	(2.260)	(2.250)
Observations	496	496	496	496	496	496	496	496
R^2	0.251	0.251	0.248	0.249	0.244	0.244	0.244	0.246
Number of ID	375	375	375	375	375	375	375	375

Standard errors in parentheses *** p<0.001, ** p<0.01, * p<0.05, t p<0.10

entrepreneur. This is in line with Chen and Thompson's (2016) finding that the effect of experience diversity on the likelihood that an individual becomes an entrepreneur is dependent on the sample and regression specification used to test the relationship. The Inverse Mills Ratio is an insignificant predictor of entrepreneurial performance, indicating that our sample does not suffer from a self-selection bias.[7]

Third, we included working experience and its square in the model, since studies have found working experience to have a non-linear effect on performance (Dahl & Sorenson, 2012; van der Sluis et al., 2008). Working experience is measured in years. We fail to find a significant relationship between work experience and entrepreneurial performance.[8]

Discussion

This paper explores the relationship between entrepreneurial experience and entrepreneurial performance. As Lazear's jacks-of-all-trades theory argues, entrepreneurs need widespread experience across many different business areas to be able to perform all the tasks associated with being an entrepreneur (Lazear, 2004, 2005). One of this theory's key arguments is that the more diverse an entrepreneur's experience, the more successful she will be. The evidence found by studies testing this argument is mixed. Hartog et al. (2010) find, just like Bublitz and Noseleit (2014), entrepreneurs to be more successful if their experiences are more diverse. Yet, Åstebro and Thompson (2011) report the opposite. That is, the more diverse an entrepreneur's experience, the less successful she will be. The mixed effect found by Åstebro and Yong (2016) is in line with the contradicting findings of Åstebro and Thompson (2011) and Hartog et al. (2010). They reveal that experience diversity measured as the number of

[7] Table can be found in Appendix A3.
[8] Table can be found in Appendix A4.

past occupations has a negative effect on performance, whereas experience diversity measured as the number of industries is shown to have a positive effect on performance.

We find experience diversity to be positively related to performance up to 23 – 24 skills: possessing more than 23 – 24 skills comes with lower entrepreneurial performance. This downside to experience diversity is only found in one case, namely when experience diversity is measured as the number of skills possessed and when we do not depreciate for experience. When depreciating for experience, the downside of experience diversity disappears, leaving experience diversity to be positively related to entrepreneurial performance. This finding indicates that old experience is negatively associated with entrepreneurial performance, whereas new experience is positively associated entrepreneurial performance. A possible explanation may be that older experience dilutes. So, an entrepreneur may have some idea of what she has learned in the past. However, as time passes, this comes less accurate and detailed, since experience deteriorates over time (Boone et al., 2008; Madsen & Desai, 2010). The older experience, the more difficult it is for an entrepreneur to know the origin of the outcomes of her experiences. Hence, due to this the lack of accurate and detailed knowledge, an entrepreneur may draw wrong inferences, while believing she is drawing correct inferences. This may result in lower entrepreneurial performance (Reed & Defillippi, 1990; Zollo, 2009). Skills and knowledge learned from recent experiences are still accurate, and have not deteriorated yet. Therefore, an entrepreneur is less likely to draw wrong inferences. Hence, excluding older experience from our measure of experience diversity causes the downside of experience to disappear, leaving a linear positive relationship between experience diversity and entrepreneurial performance.

Another of this study's contributions relates to our measure of experience diversity. Studies testing the jacks-of-all-trades theory use either skills currently possessed by entrepreneurs (Lechmann & Schnabel, 2014), skills possessed before the start of their careers (Hartog et al., 2010), or the number of occupational fields and industries an entrepreneur has experience in (Åstebro & Thompson, 2011; Åstebro & Yong, 2016) to measure experience diversity. Our study adds to this by creating time-varying measures in which we unpack the number of occupations into skill and knowledge sets gained in these occupations. Hence, our dataset allows us to construct a measure in which we cover both the skills gained in past occupations and the skills currently possessed by an entrepreneur. By doing so, we further open the black box of experience.

Although literature on learning considers knowledge and skills to be both outcomes of experience, discussion continues as to what the primary outcome of experience is. Some scholars take skills as the most important outcome of experience, an example being Levitt and March (1988). Others focus on knowledge as the most important outcome of experience. Nass (1994), instance, finds knowledge to be the primary result of experience. We find *Skill experience diversity* to have an inverted U-shaped relationship with performance if experience is not depreciated for, whereas we do not find such a relationship if experience diversity is measured as the number of knowledge domains. However, when depreciating for experience and controlling for industries, we reveal that the more diverse the knowledge of an entrepreneur, the higher her entrepreneurial performance. Similarly, the more skills an entrepreneur possesses, the higher her performance if we depreciate for experience and control for industries. Thus, although we find a relationship between experience diversity and performance for both measures of experience diversity, experience diversity measured in skills

seems to be more robust across all our models, indicating that experience diversity measured in skills may be a better predictor for entrepreneurial performance than experience diversity measured in knowledge domains.

A possible explanation for this finding could be that skills possessed by an entrepreneur reflect her abilities, while knowledge consists of facts and procedures. Although the importance of knowledge of the market and market opportunities is evident, this is not enough if one does not possess the capabilities to implement this knowledge. Skills are therefore needed to deliver success, as skills reflect the capabilities of an entrepreneur needed to execute her activities. The essential importance of skills for an entrepreneur is also reflected in the very definition of an entrepreneur. Both the occupational and the behavioral notion of entrepreneurship define an entrepreneur on the basis of her skills (Shane & Venkataraman, 2000; Sternberg & Wennekers, 2005). The occupational notion of entrepreneurship considers someone to be an entrepreneur when this individual owns and manages a business, and the behavioral notion of entrepreneurship takes someone to be an entrepreneur when she identifies and exploits opportunities (Shane & Venkataraman, 2000; Sternberg & Wennekers, 2005). Hence, besides that skills are needed to produce success as skills reflect the capabilities of an entrepreneur, the critical importance of skills for an entrepreneur is also reflected in its very definition.

We find that entrepreneurial experience is negatively related to entrepreneurial performance, whereas industry experience is positively associated with entrepreneurial performance. A possible explanation for the negative relationship between entrepreneurial experience and performance relates to what entrepreneurs learn. In the learning literature, several arguments have been put forward to explain potential downsides of experience and learning, such as limited comparability of past experiences,

and hence causal ambiguity, as well as an individual's tendency to minimize cognitive effort (Reed & Defillippi, 1990; Zollo, 2009), reducing the understanding of causal relationships associated with experiences. Therefore, an entrepreneur will not be able to exploit learning opportunities offered by any new experience to the fullest, as she does not fully understand the causal relationships between experiences and outcomes. Related to this, Fredrickson and Kahneman (1993) show that the duration of an experience has little influence on how a certain experience is evaluated. That is, salient moments within an experience are more important for an individual when evaluating an experience than the actual duration of an experience. This would imply that the number of years of experience, be it industry experience or entrepreneurial experience, may be of lesser influence than what was actually experienced: i.e., successes or failures.

Note that this negative finding contradicts with the standard human capital argument, as studies on human capital found both types of experience to have a small, yet positive effect on entrepreneurial success (Unger et al., 2011). However, our finding of the negative relationship between entrepreneurial experience and performance is in line with what Muehlfeld, Urbig and Weitzel (2015) have reported in their study, showing that individuals with more entrepreneurial experience have weaker performance than individuals with less entrepreneurial experience. They explain this negative relationship by the increased level of exploratory perseverance of entrepreneurs with more entrepreneurial experience compared to entrepreneurs with less entrepreneurial experience. This higher level of exploratory perseverance implies that individuals with more entrepreneurial experience explore more alternatives than individuals with less entrepreneurial experience. Thus, entrepreneurs who have higher

exploratory perseverance explore more alternatives – including alternatives that seemed successful at first, but ended up being less successful – which implies lower performance.

Another possible explanation for the found negative relationship between entrepreneurial experience and entrepreneurial performance is that entrepreneurs who have failure experience are treated differently than entrepreneurs who do not have failure experience by outside stakeholders. An entrepreneur's failure experience sends negative signals to an entrepreneur's environment. This may reduce the likelihood that she, for instance, will receive funding in the future (Gompers et al., 2010; Hsu, 2007). Gompers et al. (2010) show that entrepreneurs with a track record of successes have an increased likelihood to receive the needed resources vis-à-vis entrepreneurs who have failed in the past.

This study has some limitations, one of which is the possible endogeneity of industry experience and entrepreneurial experience. Another of this study's limitations is that individuals could skip questions when answering the survey. They did not always indicate in which industry they were active or in which occupational field they had experience. Hence, the actual level of experience or the actual level of experience diversity may be higher than the reported level. The lack of complete industry experience data severely limits the size of the sample if we control for industry. Strikingly, we fail to find a relationship between the entrepreneur's experience (diversity) and entrepreneurial performance in most of our models estimated for the large sample of 1,304 entrepreneurs, but do find experience and experience diversity to be significantly associated with performance in our much smaller sample of 375 entrepreneurs after controlling for industry. Hence, when the reported level of experience and experience diversity is more likely accurately reflect the actual level, we do

reveal that experience and experience diversity influence entrepreneurial performance.

Another of this study's limitations, associated with the NLSY79 and O*NET databases, is that the absence of a perfect match between 1970 and 2010 SOC codes. The 2010 SOC codes are much more detailed. Thus, when information is aggregated to the 1970 SOC classification system, substantive detail is lost. For example, two 2010 SOC codes may be one 1970 SOC code. In this case, skill A may be important for profession A with 1970 SOC code B, but does not have to be important for profession C with 1970 SOC code B. The (unavoidable) aggregation implies the assumption that professions grouped under one 1970 SOC code are related. Therefore, within one 1970 SOC code, the level of importance may vary per profession to a certain degree, but not to the extent that a skill is very important for one profession and completely irrelevant for another within the same 1970 SOC code.

One more issue involves the question regarding the extent in which an entrepreneur's past successes and failures may moderate the relationship between experience diversity and entrepreneurial performance. If an entrepreneur has encountered many successes in her past career, the positive relation between experience diversity and entrepreneurial performance may decrease. These successes trigger lower-level learning (Appelbaum & Goransson, 1997; Cope, 2005). As they do not force an entrepreneur to rethink her routines, this makes it more difficult to draw correct inferences from what was experienced (Reed & Defillippi, 1990). This, in turn, may increase causal ambiguity, resulting in an amplified negative relation between experience diversity and performance. The extent to which the relationship between experience diversity and performance depends on an entrepreneur's past successes and failures is

an interesting topic for future research.

We examine the relationship between accumulated skill diversity and entrepreneurial performance, whereas Hartog et al. (2010) investigate the relationship between innate skill diversity and entrepreneurial performance. Hartog et al. (2010) find a positive association between innate skill diversity and entrepreneurial performance, and we provide evidence for a positive association with accumulated skill variety. A possible explanation for these similar entrepreneurial performance effects of innate and accumulated skill diversity may be that the two are highly correlated: individuals with high innate skill diversity might have many talents, driving them to select into a varied career path, hence accumulating more diverse experiences during their working career. However, how innate skill diversity relates to its accumulated counterpart has yet to be investigated. This reflects another interesting future research issue.

We studied the number of skills and knowledge fields entrepreneurs had acquired during their working careers without delving into the types of skills they had acquired. Another direction for future research may be to study what type of skills and knowledge fields are most important to have. For example, for an entrepreneur, it may be more important to have administrative skills than writing skills.

Furthermore, experience and experience diversity are related. That is, an entrepreneur needs experience to have diverse experiences. As our results have indicated, experience dilutes over time. Hence, diverse experiences acquired over a short period of time may have a different effect on performance than the same diverse experiences acquired over a longer time period. Future research may study the interaction effect of experience and experience diversity.

Another direction for future research may be to examine the effects of

an entrepreneur's skill set at the start of his or her entrepreneurial career. Mathias, Williams, and Smith (2015) have shown that an individual's experiences at the start of his or her entrepreneurial career have a sustaining effect on the decisions s/he makes as an entrepreneur. However, we only considered the effect of having diverse experiences regardless of the types and number of skills at the start of his or her entrepreneurial career. Hence, future research may disentangle the possible effect of experience diversity and imprinting on entrepreneurial performance.

Chapter 4

The optimal strategy logic for an entrepreneur with experience diversity[9]

Causation or effectuation? An empirical study among Dutch self-employed

Abstract

This study explores how entrepreneurs' experience diversity affects how they run their business, and how this chosen strategy logic – i.e., causation and/or effectuation – influences their performance. To test this, we examine survey data from 3,513 entrepreneurs in the Netherlands. Our results indicate that the performance effects of the use effectual logics and the use of causal logics are non-linear and dependent on the entrepreneur's level of experience diversity. Entrepreneurs scoring low and high on experience diversity are better off using effectual logics, whereas entrepreneurs with intermediate experience diversity are better off using causal logics. However, the significance of the relationships between the interaction terms of experience diversity and the logic used and entrepreneurial performance was not consistent across all our models, but differed depending on the sample that was used.

[9] This chapter is the result of joint work with Arjen van Witteloostuijn

Introduction

Over the past decade, the literature testing Lazear's jacks-of-all-trades theory (2004, 2005) has been expanding rapidly. This literature mainly answers two questions: firstly, who becomes an entrepreneur?; and secondly, who is more successful as an entrepreneur? The evidence found for the relationship between experience diversity and performance is mixed. Some studies report that experience diversity is negatively related to performance (Åstebro & Thompson, 2011; Åstebro & Yong, 2016), and others that experience diversity is positively associated with performance (Bublitz & Noseleit, 2014; Hartog et al., 2010). We argue that the literature on causation and effectuation (Sarasvathy, 2001) may complement extant work on the relationship between experience diversity and entrepreneurial performance as this literature seeks to answer the question as to how entrepreneurs run their business. Examining this question may offer valuable insights into why entrepreneurs with high experience diversity perform better or worse than entrepreneurs low in experience diversity, so contributing to explaining the reported mixed effects of experience diversity on performance.

Entrepreneurs using causal logics focus on maximizing earnings, conducting detailed competitive analyses, exploiting knowledge, and trying to predict the future. Entrepreneurs applying effectual logics concentrate on minimizing the loss to what they can afford to lose, forming strategic alliances, exploiting emerging possibilities, and trying to control controllable facets of the future (Sarasvathy, 2001). Both approaches imply a fundamentally different strategy logic: causation is akin to planning, seeking for means to reach pre-defined ends; effectuation is experimenting-oriented, searching for aims that can be reached with given means. Prior work thus far mainly focused on examining the antecedents of the use of

causal or effectual logics (Perry, Chandler, & Markova, 2012). Only recently, empirical tests of the theory started to emerge.

Our study's contribution to the literature is twofold. First, we add to the literature on experience diversity by examining which logic is negatively or positively related with the entrepreneur's low or high experience diversity, and how this affects entrepreneurial performance. This may provide an explanation for the mixed evidence regarding the relationship between experience diversity and performance. By doing so, we may produce insights into the issue as to whether or not high experience diversity per se is bad or good for performance by adding a contingency in the form of a (mis)fitting causation or effectuation strategy that interacts negatively or positively with the entrepreneur's experience diversity. As a by-catch, we offer a tentative answer to the question as to how an entrepreneur's experience diversity is associated with the way s/he runs her/his business, as opposed to who becomes an entrepreneur and who is more successful.

Our second contribution relates to the literature on causation and effectuation. Our study moves beyond Smolka, Verheul, Burmeister-Lamp and Heugens (2016) by including a key contingency (i.e., the experience diversity), and by collecting data in an entrepreneurial adult population (i.e., Dutch entrepreneurs). As Sarasvathy (2001) and Read and Sarasvathy (2005) argue, the optimal logic – i.e., causal or effectual – is dependent on characteristics of the individual entrepreneur. That is, some entrepreneurs may be more successful using causal logics, whereas others may be more successful applying effectual logics. Hence, we compare the extent to which an entrepreneur uses causal logics with the extent to which this entrepreneur applies effectual logics, and which of the two logics is most successful depending upon the experience diversity contingency. As the

sample of Smolka et al. (2016) includes only student entrepreneurs, and thus entrepreneurs with little experience, they could not explore this issue. We can do so, because we have large variation in the relevant contingency – i.e., experience diversity. But before presenting and discussing our empirical method and evidence, we first review the literature and develop our theory.

Literature

Experience diversity

Lazear's jacks-of-all trades theory states that entrepreneurs need to be jacks of all trades for them to be able to fulfill all the tasks associated with being an entrepreneur (Lazear, 2004, 2005). He argues that an entrepreneur is only as strong as her/his weakest skill. Hence, entrepreneurs need a balanced skillset. This balanced skillset is to be developed through accumulating diverse experience. Lazear's initial theory is about the likelihood that an individual will become an entrepreneur. It is not about how successful this individual will be as an entrepreneur. However, both the probability that individuals will become entrepreneurs as well as their success as entrepreneur have been empirically explored, producing mixed results (e.g., Åstebro, Chen, & Thompson, 2011; Åstebro & Thompson, 2011; Åstebro & Yong, 2016; Chen & Thompson, 2016; Lechmann & Schnabel, 2014; Oberschachtsiek, 2012; Silva, 2007).

Lazear (2005) finds that individuals are more likely to become an entrepreneur if they have worked in more different occupations during their career. However, this effect is not replicated by Lechmann and Schnabel (2014), although they report support for Lazear's argument that entrepreneurs need more skills to perform all the tasks associated with entrepreneurship. Possessing basic knowledge of these skills is not enough;

entrepreneurs need expert skills. In line with this, Roberts, Negro and Swaminathan (2013) demonstrate that entrepreneurs have to be specialists. If entrepreneurs switch from being a specialist to becoming a generalist, this is associated with a loss in quality of their products and/or services.

Bublitz and Noseleit (2014) find evidence for a positive relationship between the experience diversity of an entrepreneur and her/his performance. Similarly, Åstebro et al. (2011) reveal, in most of their models, a positive relationship between experience diversity and entrepreneurial performance. However, Åstebro and Thompson (2011) report a negative relationship between experience diversity and entrepreneurial performance. Chen and Thompson (2016) show that the direction of the effect of experience diversity on the probability to become an entrepreneur is dependent on the sample and selection method. So, the extant literature on experience diversity seeks to explain which individuals are most likely to become an entrepreneur and which entrepreneurs are most likely to be successful, producing mixed evidence regarding the latter issue.

However, prior work does not examine how these entrepreneurs run their business conditional on their degree of experience diversity. Somewhat related, Hessels, Brixy, Naude and Gries (2014) and Åstebro and Yong (2016) do examine the relationship between entrepreneurs' degree of experience diversity and their innovations. Hessels et al. (2014) link the establishment of a new venture to an entrepreneur's experience diversity. They find evidence that entrepreneurs with more diverse experience are more likely to develop and introduce valuable innovations. These innovations are both technologically and commercially valuable. In line with Hessels et al. (2014), Åstebro and Yong (2016) show that entrepreneurs having more diverse experience develop more innovative

ideas. These ideas tend to be better and more successful than the ideas developed by entrepreneurs with lower experience diversity. They differentiate between experiences gained in different occupations vis-à-vis different industries. Both types of experience diversity have a positive effect on the quality of the inventions developed. Furthermore, these two forms of experience diversity can operate as substitutes. However, the quality of inventions drops if an entrepreneur has worked in a wide variety of industries and has been active in a large variety of occupations.

Causation and effectuation

Sarasvathy (2001) distinguishes between two types of logics that entrepreneurs may use to establish and run their business, which she coins causation and effectuation. Causation is defined as the processes that "take a particular effect as given and focus on selecting between means to create that effect" (Sarasvathy 2001: 245), and effectuation as the processes that "take a set of means as given and focus on selecting between possible effects that can be created with that set of means" (Sarasvathy 2001: 245). On the one hand, causation processes are more appropriate when dealing with events that occur on a regular basis, as these events can be analyzed; on the other hand, effectuation processes are more suitable when dealing with an uncertain future, which offer little – if any – opportunities to engage in effective planning.

The key differences between causation and effectuation can be illustrated with reference to four principles. First, entrepreneurs using causal logics focus on maximizing their expected results when deciding what strategy to pursue, whereas entrepreneurs applying effectual logics concentrate on how much they can afford to lose, selecting projects within the boundaries of this predetermined ceiling of affordable loss. Second,

entrepreneurs with causal logics conduct competitive analyses when determining their strategies, while entrepreneurs using effectual logics develop strategic alliances to overcome competitive disadvantages. Third, entrepreneurs adopting causal logics exploit the knowledge they already possess, whereas entrepreneurs having effectual logics reap the opportunities as they come along unexpectedly over time. Fourth, entrepreneurs pursuing causation follow the logic that "to the extent we can predict the future, we can control it" (Sarasvathy, 2001: 252); in contrast, effectuation entrepreneurs adopt the logic that "to the extent we can control the future, we do not need to predict it" (Sarasvathy, 2001: 252).

Causation's logic is akin to the traditional rational planning perspective taken in the literature on decision-making (Sarasvathy, 2001; Smolka et al., 2016). Effectuation is different, and therefore requires further explanation. Basically, entrepreneurs who use effectual logics start with three questions: (1) who am I, (2) what do I know, and (3) who do I know? The first question 'who am I?' is about their characteristics, their skills, and their preferences. The second question "what do I know?' involves their knowledge base. The third question 'who do I know?' incorporates their social network. The answers to this set of three questions form the key resources that effectuation entrepreneurs have at their disposal (Sarasvathy, 2001), which will shape the choices that these entrepreneurs will make, now and in the future. By and large, three behavioral patterns are characteristic for an effectuation entrepreneur.

First, they tend to select projects that are associated with a loss that is affordable in the worst-case scenario. Projects in which an entrepreneur can lose more than s/he can afford are rejected. Second, they prefer to focus on short-term experiments to figure out which business model works best.

Third, they are more likely to put emphasis on pre-commitments that offer the opportunity to control for an unpredictable future. These pre-commitments, often in the form of alliances, are established within their social networks – e.g., involving customers and suppliers – in order to minimize uncertainty. This allows an effectuation entrepreneur to spread risk over all her/his alliances. Because of these the pre-commitments, and the associated strategic alliances, an entrepreneur using effectual logics is more flexible, and therefore less in need of predicting the future (Sarasvathy, 2001).

Theory

Combining insights from both literatures regarding experience diversity, on the one hand, and causation / effectuation, on the other hand, we develop a contingency theory of experience diversity, taking causation / effectuation as a potentially influential moderator explaining the mixed evidence regarding the performance effect. Note that we do not predict main performance effects, as both the literature on experience diversity and that regarding causation and effectuation are ambiguous on the relationship with entrepreneurial performance. We already briefly referred to the experience diversity literature in this regard in the Introduction. Similarly, although the literature on causation and effectuation only recently started to empirically explore the effect of effectuation and causation on performance, the evidence produced so far is inconsistent, too. Two of these (rare) recent studies illustrate this.

First, Smolka et al. (2016) predict an unconditionally positive relationship between the use of effectual logics and performance and the use of causal logics and entrepreneurial performance. Second, this positive relationship between both causation and effectuation, on the one hand, and

entrepreneurial performance, on the other hand, is also hypothesized by McKelvie, DeTienne and Chandler (2013). Such a universal and unconditionally positive hypothesis implies limited predictive discrimination. However, using different measures for entrepreneurial performance McKelvie et al.'s (2013) findings show that both causation and effectuation have mixed effects on performance, depending on the measure of performance used.

This prior empirical work regarding the performance effect of causation and effectuation neglects the influence of contingencies. Sarasvathy (2001) argues that what will be the most beneficial logic – i.e., causation or effectuation – is dependent on contingencies. Two categories of contingencies are of importance here: external and internal contingencies. External contingencies involve, for example, market dynamics and competitive intensity. For instance, Sarasvathy (2001) argues that the use of effectual logics may be more appropriate when dealing with uncertainties. Internal contingencies involve, e.g., experience and expertise. Read and Sarasvathy (2005) develop a theory on experts and their potential success in using effectual logics. We define experts and generalists following Lazear (2004) and Foley and Hart (1992). Experts are those entrepreneurs that have gathered significant experience in one or a small number of domains, whereas generalists have gathered experience in a wide array of domains.

Read and Sarasvathy (2005) argue that experts are more likely to use effectual logics, because of the parallels between effectual logics and expert decision-making, and how experts use their expertise. They identify four parallels between essential features of effectuation and what is known from the expertise literature. The first parallel is that experts tend not to use predictive information to determine what actions they will undertake.

Instead, experts prefer to use knowledge gained from previous experience to assess the value of information from external inputs (Chase & Simon, 1973). Similarly, when using effectual logics, an entrepreneur does not use predictive information either. This is because s/he expects the future to be unpredictable anyway, and hence tries to control this uncertainty such that s/he does not have to predict the future (Sarasvathy, 2001).

The second parallel is that experts have the tendency to focus on what they are capable of – i.e., on what is within their range of abilities. Hence, they would rather combine their past experiences with their current activities than come up with a new plan that is dependent on aspects that they cannot control (Read & Sarasvathy, 2005; Sarasvathy, 2001). Again, this corresponds to a key aspect of the use of effectual logics. With effectual logics, the entrepreneur selects her/his actions based on the means or tools that s/he has. These means or tools include, for instance, an expert's skills, knowledge and previous experiences (Sarasvathy, 2001).

The third parallel is that experts choose their actions based on the resources they have. Because experts can benefit from a larger collection of experiences, and thus knowledge, than novices, it is easier for them to determine their actions based on these previous experiences (Read & Sarasvathy, 2005; Sarasvathy, 2001). The fourth parallel is that experts prefer ex post contingency responses to ex ante rational planning to achieve their objectives. This, too, is a key characteristics of effectuation (Sarasvathy, 2001). The use of contingencies allows for a larger variety of strategies, which permits experts and entrepreneurs alike to be more flexible in their responses to unforeseen opportunities and threats.

What logic experts and novices use is empirically examined by Dew, Read, Sarasvathy and Wiltbank (2009), showing how experts prefer using effectual logics and novices causal logics. The reason for this is, as above,

that in the process of accumulating experience the entrepreneur increasingly develops into an expert in this particular domain. As they become experts, entrepreneurs have a larger collection of experiences from which they can draw information when needed. Dew et al. (2009) show that these experts prefer to focus on the loss they can afford, rather than on the expected returns of their investments. Furthermore, they prefer to develop partnerships, rather than to focus on forecasts to predict the future. These are all characteristics of effectuation.

In the current study, we follow this important and insightful lead by focusing on the entrepreneur's experience diversity as a potentially critical internal contingency. The more diverse experiences an entrepreneur gains, the less experience s/he has per skill and/or knowledge field. So, mutatis mutandis, the more s/he turns into a generalist and the less s/he will use effectual logics. Therefore, an entrepreneur's level of experience diversity does not simply translate in this entrepreneur having equal total experience per skill and/or knowledge domain. For instance, some entrepreneurs with many years of experience may have been active in only one particular industry and in only one particular occupation, whereas other entrepreneurs with many years of experience may have operated in a large variety of industries and/or a large range of occupations. The latter have a high level of experience diversity, akin to the profile of a generalist, while the former are experts with a low level of experience diversity.

Because high experience diversity entrepreneurs have gained their experience in a wide variety of industries and/or occupations, they have acquired many different skills and accumulated in many different knowledge domains (Lazear, 2004; Lechmann & Schnabel, 2014). According to the jacks-of-all-trades theory, this is essential to be capable to fulfill the wide range of tasks associated with being an entrepreneur – for example,

detecting opportunities, acquiring the needed resources for a project, and maximizing returns by executing these projects (Casson & Wadeson, 2007). This is line with elements associated with the use of causal logics. Entrepreneurs using causal logics focus analytically and rationally on their environment. For instance, they conduct competitive analysis to identify their best opportunities (Chandler, DeTienne, McKelvie, & Mumford, 2011), and they concentrate on maximizing their potential earnings by selecting the most propitious opportunities.

As causation involves a wide range of tasks – such as making a business plan, conducting competitive analyses, determining goals and strategies, and selecting the needed means to accomplish these goals – high experience diversity entrepreneurs will be more successful in executing all the tasks associated with causation. The more diverse an entrepreneur's experiences, the more likely s/he is to possess the required knowledge and skills to fulfil all tasks associated with entrepreneurship, and the more likely s/he is to perform well when s/he applies a causal logic. However, possessing this wide range of skills and knowledge comes at a cost: as an entrepreneur's experience diversity increases, the expert knowledge per skill decreases. An entrepreneur cannot be an expert on every skill associated with entrepreneurship, due to cognitive limitations. Baron (1998) argues that entrepreneurs are more likely to suffer from cognitive biases because of, for example, information overload. Hence, as experience diversity increases, the cognitive biases, such as overoptimism (Baron, 1998) and superstitious learning due to causal ambiguity (Zollo, 2009), also increase. Moreover, Read and Sarasvathy (2005) argue that to use effectual logics successfully, one needs expert knowledge, because experts have a larger collection of experiences from which they can draw information when needed. This large collection of experiences is required for certain

key characteristics of effectuation, such as, experimentation and dealing with non-predictive strategies. Therefore, the more diverse an entrepreneur's experiences, the more likely s/he is to miss the expertise needed to execute some of the aspects associated with effectuation, and the more likely s/he is to perform poor when applying effectual logics.

> ***Hypothesis 1****: (a) The effect of effectuation on entrepreneurial performance is positive if an entrepreneur's level of experience diversity is low; and (b) the effect of effectuation on entrepreneurial performance is negative if an entrepreneur's level of experience diversity is high.*

> ***Hypothesis 2****: The effect of causation on entrepreneurial performance is positive if an entrepreneur's level of experience diversity is high; and (b) the effect of causation on entrepreneurial performance is negative if an entrepreneur's level of experience diversity is low.*

Methodology

Data

Our data are from a survey administered among entrepreneurs in the Netherlands. The survey was widely circulated in May 2016 to 483,876 email addresses. The email addresses were obtained via web-scraping techniques on the basis of Chamber of Commerce information. Respondents were promised a personalized benchmark report. Additionally, respondents could win a trip to Art Basel, Tech Crunch or the Milan Design Week. Of the 483,876 invited entrepreneurs, 18,885 started with the survey. Of these, 7,675 entrepreneurs completed the questionnaire. Due to missing observations, this gives a sample of useable responses from 3,513

entrepreneurs. To check for a non-response bias, we compare early to late respondents, following Armstrong and Overton (1977). Respondents are considered to be late respondents when they started the survey after the second reminder. Late respondents are not significantly different from their early counterparts in terms of age, gender, establishment age, and work experience.

Although both our independent and dependent variables come from the same survey, we do not expect our model to suffer from common-method bias, because we only use parts of a large survey and because use complex models including interaction effects (Chang et al., 2010).

Measures

Entrepreneurial performance is measured as revenue in 2015 in Euros. This is an interval variable, ranging from 0 to 28, where 0 reflects revenues of 0 Euros and 28 of more than 5,000,000 Euros. The theory on effectuation is on earnings, i.e. profit. However as we do not have data on profit, we use revenue as a proxy for earnings. *Causation* is captured with the seven-item scale developed by Chandler et al. (2011), and *Effectuation* with Chandler et al.'s (2011) scale of 17 items. All causation and effectuation items are measured on a seven-point Likert scale, ranging from strongly disagree to strongly agree. To calculate an entrepreneur's score on the use of causal logics, we used a least squares regression approach (DiStefano, Zhu, & Mindrila, 2009; Thurston, 1935). The effectuation scale is designed as a formative construct composed of four factors: experimentation, pre-commitments, affordable loss, and flexibility. To calculate an entrepreneur's score on effectuation, we created an index score, following Diamantopoulos and Winklhofer (2001). In order to so, we first calculated the factor scores of the four factors using a least squares

Table 4.1 Causation and effectuation scales

	Item	Cronbach's alpha
Experimentation	We experimented with different products and/or business models	0.67
	The product/service that we now provide is essentially the same as originally conceptualized	
	The product/service that we now provide is substantially different than we first imagined	
	We tried a number of different approaches until we found a business model that worked	
Pre-commitment	We used a substantial number of agreements with customers, suppliers and other organizations and people to reduce the amount of uncertainty	0.79
	We used pre-commitments from customers and suppliers as often as possible	
	Network contacts provided low cost resources	
	By working closely with people / organizations external to our organization we have been able to greatly expand our capabilities	
	We have focused on developing alliances with other people and organizations	
	Our partnerships with outside organizations and people play a key role in our ability to provide our product/service	
Affordable Loss	We were careful not to commit more resources than we could afford to lose	0.84
	We were careful not to risk more money than we were willing to lose with our initial idea	
	We were careful not to risk so much money that the company would be in real trouble financially if things didn't work out	
Flexibility	We allowed the business to evolve as opportunities emerged	0.70
	We adapted what we were doing to the resources we had	
	We were flexible and took advantage of opportunities as they arose	
	We avoided courses of action that restricted our flexibility and adaptability	
Causation	We analyzed long run opportunities and selected what we thought would provide the best returns	0.86
	We developed a strategy to best take advantage of resources and capabilities	
	We designed and planned business strategies	
	We organized and implemented control processes to make sure we met objectives	
	We researched and selected target markets and did meaningful competitive analysis	
	We had a clear and consistent vision for where we wanted to end up	
	We designed and planned production and marketing efforts	

regression approach (DiStefano et al., 2009; Thurston, 1935). These four factor scores are summed up, and subsequently divided by 4. The factors, items and Cronbach's alphas of causation and the four factors of effectuation are listed in Table 4.1. *Experience diversity* is measured in three different ways: i.e., occupational diversity, industry diversity and task diversity. Following Åstebro and Yong (2016), we measure occupational diversity by asking the entrepreneur in how many different occupational fields of experience the respondent has been active, and industry diversity by asking in how many distinct industries s/he has been active. Following Bublitz and Noseleit (2014) and Lechmann and Schnabel (2014), we capture task diversity by asking entrepreneurs how often a series of activities occur at their work, measured on a seven-point Likert scale that ranges from never to always. We calculated an entrepreneur's score on task diversity using a least squares regression approach (DiStefano et al., 2009; Thurston, 1935). The items and Cronbach's alpha for task diversity are reproduced in Table 4.2.

Table 4.2 Task diversity scale

	Items	Cronbach's Alpha
Task diversity	Marketing and sales activities Financing activities Personnel related activities Activities relating to customer service Administrative tasks	0.73

An entrepreneur's gender, age, educational level, entrepreneurial experience, and total work experience are included as control variables, as well as her/his venture's age, number of employees, international strategy (i.e., whether or not the venture engages in exporting), organizational role, and the importance of collaborative partners (cf. Baum, Bird, & Singh, 2011; Dahl & Sorenson, 2012; Lu & Beamish, 2001; Minniti & Bygrave, 2001; van der Sluis, van Praag, & Vijverberg, 2008). At the level of the entrepreneur,

gender and age are standard control variables in entrepreneurial studies (Dahl & Sorenson, 2012; van der Sluis et al., 2008). Experience tends to be positively associated with entrepreneurial performance (Baum et al., 2011; Minniti & Bygrave, 2001), as is the level of the entrepreneur's education (van der Sluis et al., 2008). Educational level is measured in four indicator variables where the baseline is high school.

At the venture level, organizational age and the number of employees are standard control variables (Åstebro & Yong, 2016; Harms & Schiele, 2012). Exporting firms are found to be more successful (Lu & Beamish, 2001). Therefore, following Lu and Beamish (2001), a dummy variable is included, which is 1 if the entrepreneur exports and 0 if s/he does not. Organizational role is captured with six dummy variables. Organizational role identifies the organization's position in the supply chain, with creator/developer taken as the baseline. The dummies refer to broker/representative, producer, distributor, media outlet, education, or service provider. The supply chain position may influence a venture's business model, and hence the preference for the use of causal or effectual logics. The importance of different types of collaborative partners is included, because Sarasvathy (2001) argues that an entrepreneur's partners are a vital aspect of effectuation.

Evidence

We tested our hypotheses using ordinary least squares regressions. Table 4.3 provides the descriptive statistics and bivariate correlations. More than half of our sample is male. On average, respondents have 21 years of work experience, of which 14 years in their current profession. A large share of 81 per cent of the entrepreneurs in our sample has a higher education degree. On average, the respondents have revenues (in 2015) between

Table 4.3 Descriptive statistics and bivariate correlations

	Variable	Mean	Std. Dev.	Min	Max	1	2	3	4	5	6	7	8	9	10	11
1	Revenues	14.21	7.29	0	28	1.00										
2	Effectuation	0.00	0.75	-3.67	2.40	0.06	1.00									
3	Causation	-0.07	1.09	-3.36	2.50	0.27	0.47	1.00								
4	Industry diversity	3.43	2.22	0	15	-0.12	0.08	0.03	1.00							
5	Occupational diversity	3.78	2.23	0	15	-0.09	0.12	0.06	0.49	1.00						
6	Task diversity	-0.08	1.16	-2.51	2.61	0.26	0.23	0.37	0.03	0.06	1.00					
7	Number of Employees	17.10	366.37	1	15000	0.06	0.01	0.04	0.00	0.04	0.01	1.00				
8	Total work experience	20.76	7.16	0	30	0.12	-0.04	0.04	0.11	0.14	0.07	-0.02	1.00			
9	Work experience in current profession	14.03	7.73	0	30	0.12	-0.10	-0.04	-0.03	-0.14	0.01	-0.03	0.55	1.00		
10	Gender (female=1)	0.36	0.48	0	1	-0.28	-0.03	-0.14	0.05	0.01	-0.07	-0.03	-0.05	-0.10	1.00	
11	Age of entrepreneur	45.07	9.12	2	80	0.04	-0.04	0.02	0.10	0.11	0.02	-0.02	0.77	0.49	-0.04	1.00
12	Age of organization	12.29	14.59	0	116	0.30	-0.05	0.07	-0.09	-0.09	0.11	0.05	0.19	0.27	-0.06	0.20
13	Education (vocational education=1)	0.15	0.35	0	1	0.05	-0.03	0.02	-0.05	-0.06	0.08	-0.01	0.09	0.10	-0.06	-0.02
14	Education (polytechnic education=1)	0.47	0.50	0	1	-0.10	-0.03	-0.02	0.04	0.06	-0.03	-0.03	-0.02	-0.04	0.06	-0.03
15	Education (university=1)	0.32	0.47	0	1	0.05	0.06	0.00	-0.01	-0.02	-0.04	0.02	-0.05	-0.05	0.03	0.04
16	Education (PhD=1)	0.02	0.14	0	1	0.02	0.03	0.03	0.01	0.00	0.02	0.06	0.03	0.03	-0.03	0.07
17	Role (broker=1)	0.11	0.32	0	1	-0.12	0.03	0.00	0.06	0.06	0.00	-0.02	0.00	-0.01	0.01	0.02
18	Role (producer=1)	0.07	0.26	0	1	-0.14	0.03	-0.02	0.04	0.04	0.00	-0.01	-0.02	0.01	-0.02	-0.04
19	Role (distributor=1)	0.06	0.24	0	1	-0.08	0.02	0.00	0.05	0.04	0.05	-0.01	0.01	-0.05	-0.01	0.01
20	Role (media outlet=1)	0.01	0.12	0	1	-0.08	0.01	0.02	0.06	0.04	-0.01	-0.01	-0.03	-0.01	0.02	-0.01
21	Role (education=1)	0.16	0.37	0	1	-0.27	0.01	-0.12	0.05	0.09	-0.10	-0.02	0.04	0.00	0.17	0.05
22	Role (service provider=1)	0.37	0.48	0	1	-0.28	-0.05	-0.15	0.15	0.09	-0.18	-0.03	0.08	0.00	0.08	0.10
23	Export (yes=1)	0.37	0.48	0	1	0.12	0.09	0.11	-0.01	0.05	0.12	0.02	-0.01	0.00	-0.11	-0.04
24	Importance of suppliers as partner	4.81	1.89	1	7	0.21	0.19	0.24	-0.01	0.04	0.29	0.03	-0.01	-0.02	-0.13	-0.07
25	Importance of customers as partner	6.38	1.01	1	7	0.01	0.12	0.08	0.04	0.02	0.08	-0.01	-0.02	-0.04	0.08	-0.04
26	Importance of competitors as partner	4.42	1.56	1	7	-0.09	0.13	-0.03	0.04	0.05	-0.05	-0.01	-0.03	-0.03	0.16	-0.06
27	Importance of intermediaries/agents as partner	3.96	1.85	1	7	0.05	0.13	0.12	0.03	0.04	0.15	0.01	-0.02	0.03	0.00	-0.06

Table continues on next page

Table 4.3 – *Continued*

	Variable	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
12	Age of organization	1.00															
13	Education (vocational education=1)	0.06	1.00														
14	Education (polytechnic education=1)	-0.01	-0.37	1.00													
15	Education (university=1)	-0.03	-0.28	-0.62	1.00												
16	Education (PhD=1)	0.00	-0.06	-0.13	-0.09	1.00											
17	Role (broker=1)	-0.08	0.00	0.02	-0.02	0.00	1.00										
18	Role (producer=1)	-0.05	-0.03	0.03	-0.02	0.01	0.23	1.00									
19	Role (distributor=1)	-0.07	0.06	-0.03	-0.02	-0.02	0.32	0.28	1.00								
20	Role (media outlet=1)	-0.01	-0.02	0.00	0.00	0.02	0.16	0.24	0.18	1.00							
21	Role (education=1)	-0.07	-0.12	0.06	0.04	0.04	0.13	0.16	0.08	0.08	1.00						
22	Role (service provider=1)	-0.19	-0.08	0.00	0.08	0.00	0.22	0.07	0.06	0.07	0.21	1.00					
23	Export (yes=1)	0.07	-0.02	-0.02	0.01	0.03	0.03	0.09	0.13	0.02	-0.04	-0.17	1.00				
24	Importance of suppliers as partner	0.07	0.16	-0.02	-0.10	-0.06	0.02	0.04	0.10	-0.01	-0.17	-0.19	0.16	1.00			
25	Importance of customers as partner	-0.08	-0.02	0.00	0.02	-0.01	0.01	0.01	-0.04	0.00	0.03	0.02	-0.01	0.16	1.00		
26	Importance of competitors as partner	-0.04	0.00	0.03	0.01	-0.02	0.02	0.00	-0.03	0.01	0.10	0.10	-0.11	-0.04	0.12	1.00	
27	Importance of intermediaries/agents as partner	0.01	0.08	0.03	-0.07	-0.04	0.07	0.04	0.04	0.03	-0.01	-0.07	0.09	0.19	0.09	0.20	1.00

€ 50,000 and € 74,999. Entrepreneurs have, on average, worked in three different industries, and have had four different occupations. None of the variables are correlated above .70. Hence, multicollinearity is not an issue. Table 4.4 provides the results of the ordinary least squares analysis for the models with entrepreneurial performance as the dependent variable. Columns 1 and 2 present the models including both self-employed and entrepreneurs with employees. As a robustness check, we run a model including only self-employed and a model including only entrepreneurs with employees. Columns 3 and 4 present the results for the sample including only self-employed, and Columns 5 and 6 those for the sample including entrepreneurs with employees. Columns 1, 3 and 5 present the main effects of our experience diversity, causation and effectuation variables on performance, and Columns 2, 4 and 6 include the interaction effects.[10]

The age of an entrepreneur is negatively related to entrepreneurial performance. Organizational age is positively associated with performance. Entrepreneurs who have more work experience, report higher entrepreneurial performance. Females have lower entrepreneurial performance. Entrepreneurs using effectual logics have lower entrepreneurial performance, whereas entrepreneurs applying causal logics have higher entrepreneurial performance. Entrepreneurs scoring high on industry diversity have lower entrepreneurial performance.

The significance levels across all models are not the same. For example, effectuation is significantly negatively related to performance for the model including entrepreneurs with employees, but insignificantly negatively related to performance for the model including self-employed.

[10] Following Smolka et al. (2016), we also ran a model with the components of effectuation as separate variables. These results are available in Appendix A5.

Table 4.4 OLS regression results

	(1)	(2)	(3)	(4)	(5)	(6)
	All		Self-employed		Entrepreneurs with employees	
Effectuation	-0.538***	-0.725*	-0.153	-0.171	-1.024***	-1.138*
	(0.146)	(0.304)	(0.161)	(0.353)	(0.273)	(0.556)
Causation	0.563***	0.429*	0.449***	0.408	0.713***	0.370
	(0.105)	(0.216)	(0.113)	(0.255)	(0.205)	(0.412)
Occupational diversity	-0.049	-0.046	-0.148**	-0.158**	0.168t	0.148
	(0.050)	(0.050)	(0.053)	(0.055)	(0.100)	(0.109)
Effectuation*Occupational diversity		-0.019		-0.003		-0.140
		(0.074)		(0.077)		(0.151)
Causation*Occupational diversity		0.034		-0.046		0.146
		(0.048)		(0.051)		(0.109)
Industry diversity	-0.139**	-0.147**	-0.042	-0.031	-0.322**	-0.370**
	(0.048)	(0.049)	(0.051)	(0.051)	(0.100)	(0.115)
Effectuation*Industry diversity		0.073		0.013		0.228
		(0.077)		(0.081)		(0.157)
Causation*Industry diversity		-0.000		0.062		-0.023
		(0.051)		(0.054)		(0.117)
Task diversity	0.131	0.135	0.002	0.015	0.259	0.397*
	(0.093)	(0.093)	(0.104)	(0.107)	(0.171)	(0.183)
Effectuation*Task diversity		-0.175		0.048		-0.149
		(0.120)		(0.139)		(0.243)
Causation*Task diversity		-0.008		0.014		-0.322t
		(0.082)		(0.099)		(0.173)
Number of Employees	0.000	0.000			0.000	0.000
	(0.000)	(0.000)			(0.000)	(0.000)
Total work experience	0.131***	0.131***	0.152***	0.153***	0.050	0.049
	(0.022)	(0.022)	(0.024)	(0.024)	(0.043)	(0.043)
Work experience in current profession	0.044**	0.044**	0.053**	0.052**	0.063*	0.064*
	(0.016)	(0.016)	(0.018)	(0.018)	(0.029)	(0.029)
Gender (female=1)	-1.954***	-1.962***	-2.312***	-2.309***	-1.386***	-1.463***
	(0.210)	(0.210)	(0.226)	(0.227)	(0.414)	(0.415)
Age	-0.095***	-0.095***	-0.115***	-0.116***	-0.028	-0.029
	(0.016)	(0.016)	(0.018)	(0.019)	(0.031)	(0.031)
Age of organization	0.072***	0.072***	0.038*	0.038*	0.070***	0.070***
	(0.007)	(0.007)	(0.017)	(0.017)	(0.009)	(0.009)
Education (vocational education=1)	-1.105*	-1.115*	-0.962t	-0.943t	-1.191	-1.232t
	(0.438)	(0.439)	(0.531)	(0.533)	(0.730)	(0.731)
Education (polytechnic education=1)	-0.105	-0.102	0.268	0.273	-0.516	-0.529
	(0.390)	(0.390)	(0.465)	(0.466)	(0.663)	(0.663)
Education (university=1)	0.985*	0.977*	1.442**	1.453**	0.382	0.309
	(0.403)	(0.403)	(0.482)	(0.482)	(0.683)	(0.685)
Education (PhD=1)	0.951	0.985	1.301	1.323	0.206	0.322
	(0.729)	(0.731)	(0.849)	(0.853)	(1.277)	(1.282)
Role (broker=1)	0.147	0.147	0.650*	0.658*	-0.583	-0.560
	(0.255)	(0.255)	(0.278)	(0.279)	(0.501)	(0.501)
Role (producer=1)	0.622*	0.606*	-0.226	-0.233	1.774**	1.765**
	(0.305)	(0.306)	(0.344)	(0.345)	(0.564)	(0.563)
Role (distributor=1)	0.929**	0.923**	0.958*	0.950*	0.730	0.773
	(0.314)	(0.314)	(0.407)	(0.407)	(0.504)	(0.504)
Role (media outlet=1)	-1.631**	-1.622**	-1.465*	-1.480*	-1.243	-1.176
	(0.616)	(0.616)	(0.716)	(0.717)	(1.082)	(1.083)
Role (education=1)	-1.506***	-1.509***	-0.860***	-0.857***	-3.048***	-2.978***
	(0.247)	(0.247)	(0.248)	(0.249)	(0.571)	(0.571)
Role (service provider=1)	1.154***	1.147***	1.359***	1.365***	0.790t	0.802t
	(0.212)	(0.213)	(0.235)	(0.236)	(0.409)	(0.410)
Export (yes=1)	0.233	0.233	0.201	0.186	0.466	0.465
	(0.207)	(0.207)	(0.236)	(0.237)	(0.374)	(0.374)

Table continues on next page

Table 4.4 – *Continued*

Importance of suppliers as partner	0.077	0.075	0.057	0.054	0.189	0.177
	(0.056)	(0.056)	(0.058)	(0.058)	(0.122)	(0.122)
Importance of customers as partner	0.291**	0.296**	0.419***	0.417***	0.040	0.047
	(0.095)	(0.095)	(0.107)	(0.107)	(0.174)	(0.175)
Importance of competitors as partner	0.072	0.073	0.028	0.030	0.134	0.125
	(0.063)	(0.063)	(0.069)	(0.070)	(0.119)	(0.119)
Importance of intermediaries/agents as partner	0.077	0.079	0.030	0.031	0.121	0.136
	(0.053)	(0.053)	(0.058)	(0.058)	(0.101)	(0.101)
Self-employed	-6.247***	-6.236***				
	(0.227)	(0.227)				
Agriculture	2.903***	2.907***	4.118***	4.113***	1.477	1.366
	(0.781)	(0.782)	(1.112)	(1.115)	(1.243)	(1.246)
Mining	4.318	4.480			4.443	4.763
	(5.458)	(5.460)			(6.384)	(6.377)
Manufacturing	1.686**	1.680**	-0.188	-0.181	2.390*	2.371*
	(0.635)	(0.636)	(0.812)	(0.813)	(1.084)	(1.085)
Electricity	7.550t	7.681*			5.898	6.118
	(3.888)	(3.891)			(4.596)	(4.598)
Water supply	1.704	1.817	-3.428	-3.530	6.789	6.360
	(3.883)	(3.884)	(4.720)	(4.727)	(6.412)	(6.406)
Construction	3.333***	3.294***	3.851***	3.851***	2.599*	2.501t
	(0.738)	(0.738)	(0.862)	(0.863)	(1.315)	(1.316)
Wholesale	3.053***	3.060***	2.864***	2.864***	2.900**	2.776**
	(0.490)	(0.490)	(0.602)	(0.604)	(0.886)	(0.887)
Transportation	3.606*	3.585*	4.976	5.084	3.352t	3.386t
	(1.421)	(1.422)	(3.333)	(3.338)	(1.879)	(1.879)
Accomodation	1.564t	1.535t	0.773	0.827	1.729	1.668
	(0.843)	(0.844)	(1.408)	(1.412)	(1.261)	(1.261)
Information	0.699	0.722	1.133*	1.126*	-0.178	-0.196
	(0.455)	(0.455)	(0.480)	(0.481)	(0.930)	(0.930)
Finance	2.477***	2.491***	2.586*	2.556t	2.385*	2.455*
	(0.745)	(0.746)	(1.317)	(1.319)	(1.128)	(1.131)
Real estate	0.765	0.762	0.281	0.272	1.106	1.122
	(1.066)	(1.066)	(1.360)	(1.361)	(1.723)	(1.725)
Consultancy	1.973***	1.970***	2.090***	2.072***	1.762*	1.690*
	(0.380)	(0.380)	(0.395)	(0.395)	(0.803)	(0.805)
Goods and services	1.981**	1.988***	1.038	1.033	2.960**	2.895**
	(0.603)	(0.603)	(0.710)	(0.711)	(1.077)	(1.079)
Public administration	2.704	2.710	-2.204	-2.371	7.991	7.593
	(3.874)	(3.877)	(4.710)	(4.720)	(6.400)	(6.397)
Education	1.627**	1.631**	1.587**	1.550**	2.099t	2.005t
	(0.561)	(0.561)	(0.595)	(0.596)	(1.135)	(1.138)
Health	1.157*	1.172*	0.788	0.768	2.123*	2.212*
	(0.514)	(0.515)	(0.547)	(0.547)	(1.044)	(1.044)
Culture	-0.026	-0.032	0.087	0.064	0.155	0.082
	(0.435)	(0.435)	(0.441)	(0.442)	(0.991)	(0.991)
Constant	14.226***	14.243***	7.781***	7.792***	13.591***	13.973***
	(0.974)	(0.977)	(1.120)	(1.122)	(1.737)	(1.741)
Observations	3,513	3,513	2,106	2,106	1,407	1,407
R-squared	0.450	0.451	0.229	0.230	0.188	0.194

Standard errors in parentheses *** p<0.001, ** p<0.01, * p<0.05, t p<0.10

Nevertheless, the signs are consistent across our models, with the exception of the interaction terms of causation and experience diversity.

None of our interaction terms between causation and the different measures of experience diversity are significant. Furthermore, none of our interaction terms between effectuation and the different measures of experience diversity are significant. Therefore, we fail to find support for our hypotheses.

Robustness analyses

We perform several robustness analysis to better understand the insignificant relationship between experience diversity, causation, effectuation and entrepreneurial performance. As we fail to find a linear relationship between our main independent variables and performance, we test for non-linear effects. First, we consider the possible non-linear relationship between causation and performance and effectuation and performance, which is presented in Table 4.5. Second, we analyze the possible non-linear relationship between experience diversity and performance. These results are presented in Table 4.6.

Just as in Table 4.4, Columns 1 and 2 present the models including both self-employed and entrepreneurs with employees, Columns 3 and 4 give the results for the sample including only self-employed, and Columns 5 and 6 show the results for the sample including entrepreneurs with employees. Columns 1, 3 and 5 present the main effects of our experience diversity, causation and effectuation variables on performance, and Columns 2, 4 and 6 include the interaction effects.

Though the signs are the same across all models, the significance levels are not. Effectuation is significantly non-linearly associated with

Table 4.5 OLS regression results with nonlinear effect for causation and effectuation

	(1)	(2)	(3)	(4)	(5)	(6)
	All		Self-employed		Entrepreneurs with employees	
Effectuation	-0.600***	-0.808**	-0.262	-0.332	-0.972***	-1.515**
	(0.147)	(0.312)	(0.169)	(0.376)	(0.275)	(0.575)
Effectuation^2	-0.317**	0.022	-0.251*	-0.228	-0.269	0.377
	(0.110)	(0.249)	(0.116)	(0.280)	(0.246)	(0.504)
Causation	0.543***	0.320	0.528***	0.627t	0.759***	0.519
	(0.113)	(0.238)	(0.143)	(0.323)	(0.206)	(0.422)
Causation^2	0.003	-0.223	0.080	0.251	-0.287*	-0.846**
	(0.063)	(0.138)	(0.074)	(0.170)	(0.141)	(0.292)
Occupational diversity	-0.047	-0.080	-0.146**	-0.135*	0.170t	0.068
	(0.050)	-0.064	(0.053)	(0.067)	(0.099)	(0.137)
Effectuation*Occupational diversity		-0.004		0.005		-0.068
		(0.074)		(0.080)		(0.169)
Effectuation^2*Occupational diversity		-0.096		-0.082		-0.108
		(0.061)		(0.067)		(0.136)
Causation*Occupational diversity		0.070		-0.052		0.143
		(0.052)		(0.062)		(0.113)
Causation^2*Occupational diversity		0.069*		0.013		0.111
		(0.031)		(0.034)		(0.072)
Industry diversity	-0.141**	-0.128*	-0.046	-0.001	-0.321**	-0.397**
	(0.048)	(0.063)	(0.051)	(0.065)	(0.100)	(0.135)
Effectuation*Industry diversity		0.084		0.036		0.300t
		(0.077)		(0.084)		(0.179)
Effectuation^2*Industry diversity		-0.002		0.058		-0.121
		(0.067)		(0.073)		(0.153)
Causation*Industry diversity		-0.003		0.025		-0.064
		(0.053)		(0.059)		(0.128)
Causation^2*Industry diversity		-0.011		-0.055t		0.092
		(0.030)		(0.031)		(0.084)
Task diversity	0.148	0.264*	0.010	0.011	0.277	0.450t
	(0.093)	(0.112)	(0.105)	(0.125)	(0.171)	(0.237)
Effectuation*Task diversity		-0.064		0.133		-0.043
		(0.126)		(0.148)		(0.251)
Effectuation^2*Task diversity		-0.054		-0.079		0.058
		(0.088)		(0.094)		(0.241)
Causation*Task diversity		-0.057		0.032		-0.262
		(0.093)		(0.123)		(0.186)
Causation^2*Task diversity		-0.067		0.060		-0.079
		(0.051)		(0.063)		(0.120)
Number of Employees	0.000	0.000			0.000	0.000
	(0.000)	(0.000)			(0.000)	(0.000)
Total work experience	0.132***	0.134***	0.153***	0.157***	0.057	0.058
	(0.022)	(0.022)	(0.024)	(0.024)	(0.043)	(0.043)
Work experience in current profession	0.044**	0.044**	0.053**	0.052**	0.064*	0.063*
	(0.016)	(0.016)	(0.018)	(0.018)	(0.029)	(0.029)
Gender (female=1)	-1.962***	-1.977***	-2.313***	-2.309***	-1.386***	-1.444***
	(0.210)	(0.210)	(0.226)	(0.227)	(0.414)	(0.416)
Age	-0.095***	-0.097***	-0.116***	-0.119***	-0.031	-0.036
	(0.016)	(0.016)	(0.018)	(0.019)	(0.031)	(0.031)
Age of organization	0.071***	0.071***	0.038*	0.039*	0.069***	0.070***
	(0.007)	(0.007)	(0.017)	(0.017)	(0.009)	(0.009)
Education (vocational education=1)	-1.104*	-1.139**	-0.982t	-0.928t	-1.182	-1.145
	(0.438)	(0.438)	(0.531)	(0.534)	(0.729)	(0.730)
Education (polytechnic education=1)	-0.078	-0.078	0.270	0.312	-0.481	-0.381
	(0.390)	(0.390)	(0.465)	(0.467)	(0.663)	(0.663)
Education (university=1)	1.013*	1.011*	1.433**	1.496**	0.512	0.443
	(0.402)	(0.403)	(0.481)	(0.483)	(0.684)	(0.685)
Education (PhD=1)	0.984	1.026	1.315	1.334	0.401	0.460
	(0.729)	(0.731)	(0.849)	(0.854)	(1.277)	(1.282)
Role (broker=1)	0.138	0.127	0.622*	0.635*	-0.626	-0.571
	(0.255)	(0.255)	(0.279)	(0.280)	(0.500)	(0.501)

Table 4.5 – *Continued*

Role (producer=1)	0.624*	0.616*	-0.217	-0.229	1.763**	1.802**
	(0.305)	(0.306)	(0.344)	(0.345)	(0.563)	(0.564)
Role (distributor=1)	0.944**	0.936**	0.988*	0.987*	0.735	0.770
	(0.314)	(0.314)	(0.406)	(0.408)	(0.503)	(0.503)
Role (media outlet=1)	-1.622**	-1.664**	-1.503*	-1.488*	-1.306	-1.315
	(0.615)	(0.616)	(0.716)	(0.718)	(1.082)	(1.085)
Role (education=1)	-1.488***	-1.455***	-0.833***	-0.805**	-3.018***	-2.940***
	(0.246)	(0.247)	(0.248)	(0.249)	(0.570)	(0.571)
Role (service provider=1)	1.138***	1.124***	1.345***	1.345***	0.753t	0.788t
	(0.212)	(0.213)	(0.235)	(0.236)	(0.409)	(0.411)
Export (yes=1)	0.215	0.206	0.187	0.184	0.438	0.431
	(0.207)	(0.207)	(0.236)	(0.237)	(0.374)	(0.374)
Importance of suppliers as partner	0.074	0.075	0.052	0.045	0.211t	0.192
	(0.056)	(0.056)	(0.058)	(0.058)	(0.122)	(0.122)
Importance of customers as partner	0.291**	0.295**	0.419***	0.413***	0.014	0.008
	(0.095)	(0.095)	(0.107)	(0.107)	(0.174)	(0.175)
Importance of competitors as partner	0.070	0.067	0.030	0.030	0.120	0.119
	(0.063)	(0.063)	(0.069)	(0.070)	(0.119)	(0.119)
Importance of intermediaries/agents as partner	0.070	0.075	0.027	0.029	0.108	0.119
	(0.053)	(0.053)	(0.058)	(0.059)	(0.101)	(0.102)
Self-employed	-6.259***	-6.228***				
	(0.226)	(0.227)				
Agriculture	2.892***	2.900***	4.153***	4.124***	1.402	1.184
	(0.781)	(0.781)	(1.112)	(1.116)	(1.241)	(1.246)
Mining	4.179	4.330			4.122	4.563
	(5.453)	(5.453)			(6.374)	(6.367)
Manufacturing	1.648**	1.653**	-0.172	-0.157	2.344*	2.239*
	(0.635)	(0.635)	(0.811)	(0.813)	(1.082)	(1.087)
Electricity	7.565t	7.564t			5.774	5.893
	(3.884)	(3.886)			(4.588)	(4.595)
Water supply	1.770	1.792	-3.352	-3.637	6.660	6.191
	(3.878)	(3.878)	(4.718)	(4.726)	(6.401)	(6.396)
Construction	3.330***	3.338***	3.919***	3.939***	2.485t	2.497t
	(0.737)	(0.737)	(0.862)	(0.865)	(1.313)	(1.316)
Wholesale	3.030***	3.039***	2.859***	2.854***	2.905**	2.835**
	(0.489)	(0.490)	(0.602)	(0.604)	(0.885)	(0.888)
Transportation	3.545*	3.604*	4.812	4.896	3.210t	3.294t
	(1.420)	(1.420)	(3.332)	(3.340)	(1.876)	(1.879)
Accommodation	1.566t	1.506t	0.789	0.850	1.658	1.566
	(0.842)	(0.843)	(1.407)	(1.415)	(1.260)	(1.262)
Information	0.719	0.730	1.155*	1.166*	-0.208	-0.152
	(0.454)	(0.455)	(0.480)	(0.481)	(0.929)	(0.933)
Finance	2.495***	2.562***	2.631*	2.599*	2.360*	2.361*
	(0.744)	(0.746)	(1.316)	(1.321)	(1.126)	(1.131)
Real estate	0.755	0.800	0.300	0.281	1.116	1.229
	(1.065)	(1.065)	(1.359)	(1.360)	(1.720)	(1.722)
Consultancy	1.977***	1.976***	2.099***	2.069***	1.744*	1.750*
	(0.380)	(0.380)	(0.394)	(0.395)	(0.801)	(0.808)
Goods and services	1.989***	2.017***	1.058	1.035	2.970**	2.920**
	(0.602)	(0.603)	(0.710)	(0.711)	(1.075)	(1.079)
Public administration	2.830	2.808	-1.851	-2.104	7.821	7.584
	(3.871)	(3.872)	(4.710)	(4.722)	(6.389)	(6.385)
Education	1.666**	1.687**	1.637**	1.593**	2.067t	2.105t
	(0.561)	(0.562)	(0.595)	(0.598)	(1.134)	(1.140)
Health	1.166*	1.179*	0.816	0.817	2.115*	2.201*
	(0.514)	(0.514)	(0.546)	(0.548)	(1.042)	(1.045)
Culture	-0.031	-0.041	0.089	0.044	0.136	0.116
	(0.434)	(0.435)	(0.441)	(0.442)	(0.989)	(0.991)
Constant	14.449***	14.545***	7.881***	7.742***	14.150***	14.928***
	(0.977)	(0.988)	(1.120)	(1.132)	(1.749)	(1.797)
Observations	3,513	3,513	2,106	2,106	1,407	1,407
R-squared	0.452	0.454	0.231	0.235	0.192	0.202

Standard errors in parentheses *** p<0.001, ** p<0.01, * p<0.05, t p<0.10

Table 4.6 OLS regression results with nonlinear effect for experience diversity

	(1)	(2)	(3)	(4)	(5)	(6)
	All		Self-employed		Entrepreneurs with employees	
Effectuation	-0.545***	-0.598	-0.142	0.044	-1.055***	-1.085
	(0.146)	(0.500)	(0.161)	(0.585)	(0.272)	(0.897)
Causation	0.557***	0.645t	0.452***	0.552	0.702***	0.471
	(0.105)	(0.350)	(0.113)	(0.427)	(0.204)	(0.639)
Occupational diversity	0.172	0.217	-0.043	-0.066	0.535*	0.484t
	(0.140)	(0.140)	(0.154)	(0.160)	(0.264)	(0.283)
Occupational diversity^2	-0.018	-0.023t	-0.007	-0.007	-0.032	-0.032
	(0.012)	(0.012)	(0.013)	(0.013)	(0.022)	(0.024)
Effectuation*Occupational diversity		-0.493*		-0.386t		-0.652
		(0.215)		(0.229)		(0.434)
Effectuation*Occupational diversity^2		0.043*		0.035t		0.047
		(0.019)		(0.020)		(0.040)
Causation*Occupational diversity		0.246t		0.060		0.383
		(0.139)		(0.155)		(0.285)
Causation*Occupational diversity^2		-0.018		-0.007		-0.022
		(0.012)		(0.013)		(0.024)
Industry diversity	-0.401**	-0.406**	-0.280t	-0.259t	-0.580*	-0.587*
	(0.135)	(0.136)	(0.150)	(0.157)	(0.250)	(0.275)
Industry diversity^2	0.022*	0.023*	0.020t	0.019	0.022	0.021
	(0.011)	(0.011)	(0.012)	(0.012)	(0.020)	(0.023)
Effectuation*Industry diversity		0.437*		0.299		0.607
		(0.215)		(0.244)		(0.413)
Effectuation*Industry diversity^2		-0.032t		-0.026		-0.034
		(0.018)		(0.020)		(0.035)
Causation*Industry diversity		-0.208		-0.141		-0.120
		(0.141)		(0.163)		(0.278)
Causation*Industry diversity^2		0.018		0.017		0.009
		(0.012)		(0.014)		(0.022)
Task diversity	0.139	0.234*	0.026	0.041	0.586**	0.637**
	(0.095)	(0.100)	(0.105)	(0.110)	(0.208)	(0.210)
Task diversity^2	-0.032	-0.006	0.106	0.105	-0.336**	-0.142
	(0.060)	(0.066)	(0.073)	(0.080)	(0.122)	(0.139)
Effectuation*Task diversity		-0.203t		0.018		-0.315
		(0.121)		(0.143)		(0.295)
Effectuation*Task diversity^2		0.089		-0.002		0.198
		(0.088)		(0.107)		(0.185)
Causation*Task diversity		0.010		-0.013		0.027
		(0.088)		(0.105)		(0.201)
Causation*Task diversity^2		-0.180**		0.004		-0.353**
		(0.060)		(0.074)		(0.131)
Number of Employees	0.000	0.000			0.000	0.000
	(0.000)	(0.000)			(0.000)	(0.000)
Total work experience	0.129***	0.126***	0.155***	0.155***	0.049	0.038
	(0.022)	(0.022)	(0.024)	(0.024)	(0.043)	(0.043)
Work experience in current profession	0.045**	0.047**	0.051**	0.050**	0.073*	0.074*
	(0.016)	(0.016)	(0.018)	(0.018)	(0.029)	(0.029)
Gender (female=1)	-1.943***	-1.958***	-2.298***	-2.296***	-1.338**	-1.401***
	(0.210)	(0.210)	(0.227)	(0.227)	(0.413)	(0.415)
Age	-0.094***	-0.093***	-0.117***	-0.118***	-0.027	-0.024
	(0.016)	(0.016)	(0.019)	(0.019)	(0.031)	(0.031)
Age of organization	0.072***	0.072***	0.038*	0.038*	0.070***	0.071***
	(0.007)	(0.007)	(0.017)	(0.017)	(0.009)	(0.009)
Education (vocational education=1)	-1.084*	-1.127*	-0.984t	-1.033t	-1.052	-1.073
	(0.438)	(0.439)	(0.531)	(0.535)	(0.730)	(0.731)
Education (polytechnic education=1)	-0.077	-0.103	0.259	0.202	-0.436	-0.439
	(0.390)	(0.390)	(0.465)	(0.468)	(0.663)	(0.663)
Education (university=1)	1.002*	0.976*	1.428**	1.392**	0.482	0.360
	(0.403)	(0.402)	(0.481)	(0.483)	(0.682)	(0.685)
Education (PhD=1)	0.989	1.027	1.229	1.310	0.215	0.177
	(0.729)	(0.730)	(0.851)	(0.856)	(1.275)	(1.286)
Role (broker=1)	0.139	0.119	0.658*	0.667*	-0.625	-0.638
	(0.255)	(0.255)	(0.278)	(0.279)	(0.500)	(0.500)

Table 4.6 – *Continued*

Role (producer=1)	0.623*	0.627*	-0.244	-0.235	1.833**	1.815**
	(0.305)	(0.306)	(0.344)	(0.346)	(0.563)	(0.564)
Role (distributor=1)	0.947**	0.953**	0.983*	0.981*	0.703	0.759
	(0.314)	(0.314)	(0.407)	(0.408)	(0.503)	(0.504)
Role (media outlet=1)	-1.647**	-1.672**	-1.455*	-1.481*	-1.252	-1.199
	(0.616)	(0.615)	(0.717)	(0.719)	(1.079)	(1.082)
Role (education=1)	-1.531***	-1.541***	-0.865***	-0.884***	-3.025***	-2.888***
	(0.247)	(0.247)	(0.248)	(0.249)	(0.570)	(0.573)
Role (service provider=1)	1.137***	1.124***	1.368***	1.366***	0.765t	0.807*
	(0.212)	(0.213)	(0.235)	(0.237)	(0.408)	(0.410)
Export (yes=1)	0.224	0.205	0.178	0.154	0.429	0.475
	(0.207)	(0.207)	(0.237)	(0.238)	(0.373)	(0.374)
Importance of suppliers as partner	0.077	0.084	0.057	0.054	0.200	0.198
	(0.056)	(0.056)	(0.058)	(0.058)	(0.122)	(0.123)
Importance of customers as partner	0.288**	0.292**	0.405***	0.409***	0.041	0.054
	(0.095)	(0.095)	(0.107)	(0.108)	(0.174)	(0.175)
Importance of competitors as partner	0.075	0.073	0.025	0.028	0.135	0.125
	(0.063)	(0.063)	(0.069)	(0.070)	(0.119)	(0.119)
Importance of intermediaries/agents as partner	0.077	0.087	0.033	0.037	0.111	0.129
	(0.053)	(0.053)	(0.058)	(0.059)	(0.101)	(0.102)
Self-employed	-6.234***	-6.185***				
	(0.227)	(0.227)				
Agriculture	2.905***	2.922***	4.121***	4.064***	1.433	1.446
	(0.781)	(0.781)	(1.111)	(1.116)	(1.240)	(1.244)
Mining	4.395	4.571			4.531	4.853
	(5.457)	(5.451)			(6.367)	(6.360)
Manufacturing	1.731**	1.761**	-0.161	-0.122	2.340*	2.417*
	(0.635)	(0.636)	(0.813)	(0.816)	(1.081)	(1.085)
Electricity	7.322t	7.450t			5.547	6.082
	(3.888)	(3.888)			(4.587)	(4.595)
Water supply	1.737	1.815	-3.407	-3.392	6.549	6.621
	(3.881)	(3.878)	(4.717)	(4.730)	(6.395)	(6.391)
Construction	3.324***	3.346***	3.873***	3.894***	2.684*	2.606*
	(0.738)	(0.738)	(0.863)	(0.866)	(1.313)	(1.314)
Wholesale	3.053***	3.087***	2.896***	2.942***	2.874**	2.859**
	(0.489)	(0.489)	(0.602)	(0.605)	(0.884)	(0.886)
transportation	3.640*	3.620*	4.890	4.861	3.344t	3.390t
	(1.421)	(1.420)	(3.333)	(3.343)	(1.875)	(1.877)
Accommodation	1.593t	1.576t	0.787	0.831	1.691	1.693
	(0.843)	(0.843)	(1.407)	(1.416)	(1.258)	(1.260)
Information	0.746	0.765t	1.132*	1.115*	-0.062	-0.005
	(0.455)	(0.455)	(0.481)	(0.483)	(0.928)	(0.930)
Finance	2.442**	2.582***	2.550t	2.479t	2.325*	2.615*
	(0.745)	(0.747)	(1.316)	(1.322)	(1.127)	(1.132)
Real estate	0.719	0.729	0.290	0.262	1.059	1.188
	(1.066)	(1.065)	(1.360)	(1.362)	(1.720)	(1.722)
Consultancy	1.977***	2.011***	2.092***	2.094***	1.762*	1.796*
	(0.380)	(0.380)	(0.394)	(0.396)	(0.801)	(0.806)
Goods and services	2.006***	2.064***	1.099	1.116	2.927**	2.904**
	(0.603)	(0.603)	(0.710)	(0.713)	(1.074)	(1.078)
Public administration	2.641	2.337	-2.195	-2.210	7.457	6.713
	(3.873)	(3.872)	(4.709)	(4.727)	(6.385)	(6.389)
Education	1.632**	1.664**	1.577**	1.571**	1.995t	1.965t
	(0.561)	(0.561)	(0.595)	(0.598)	(1.133)	(1.137)
Health	1.159*	1.269*	0.756	0.768	2.123*	2.305*
	(0.515)	(0.515)	(0.547)	(0.549)	(1.042)	(1.046)
Culture	-0.017	0.002	0.090	0.083	0.133	0.172
	(0.435)	(0.435)	(0.441)	(0.443)	(0.988)	(0.990)
Constant	14.255***	14.094***	8.037***	8.098***	13.431***	13.293***
	(1.008)	(1.011)	(1.165)	(1.181)	(1.783)	(1.802)
Observations	3,513	3,513	2,106	2,106	1,407	1,407
R-squared	0.451	0.455	0.231	0.233	0.194	0.204

Standard errors in parentheses *** p<0.001, ** p<0.01, * p<0.05, t p<0.10

performance in the model without interaction effects including both self-employed and entrepreneurs with employees. The Fieller method indicates that this relation is inverted U-shaped (t=2.20, p=.014, 95% CI [-2.91 ; -.44]).[11] However, this significant non-linear relationship performance in the model without interaction effects including only entrepreneurs with employees. The Fieller method indicates that the extreme of the U-shaped relationship lies outside the data range (t=0.95, p=.171, 95% CI [.51 ; 37.67]).[12] In the other models, the non-linear relationship between causation and effectuation is insignificant. Moreover, none of the interaction terms in the models with non-linear effects for causation and effectuation are significantly related to performance.

We fail to find a non-linear relationship between occupational diversity and performance. Industry diversity in non-linearly related to performance when including both self-employed and entrepreneurs with employees. When applying the Fieller method, we find that the extreme of the U-shaped relationship lies outside the data range (t=1.32, p=.094, 95% CI [6.65 ; 70.34]).[13] However, when using subsamples (i.e., only self-employed or only entrepreneurs with employees), this significant non-linear relationship disappears. Task diversity is significantly non-linearly related to entrepreneurial performance in the model without interaction effects including only entrepreneurs with employees. The Fieller method indicates that the maximum of the inverted U-shaped relationship lies at .87 (t=2.15, p= .016, 95% CI [.37 ; 2.15]).[14] This suggests that the optimal amount of task diversity for an entrepreneur to have is slightly above the average. When including interaction models or using a different sample,

[11] The marginal plot can be found in Appendix A6
[12] The marginal plot can be found in Appendix A7.
[13] The marginal plot can be found in Appendix A8.
[14] The marginal plot can be found in Appendix A9.

this significant non-linear association between task diversity and performance disappears.

In the models with non-linear effects for experience diversity, several interaction terms are significant. The interaction terms of occupational diversity and effectuation, industry diversity and effectuation, and task diversity and causation are significantly related to performance in the model including both self-employed and entrepreneurs with employees. Additionally, the interaction term of task diversity and performance is significantly associated with performance in the model including only entrepreneurs with employees. Figure 4.1, Figure 4.2 and Figure 4.3 show the plots of the interaction terms of effectuation and occupational diversity, effectuation and industry diversity and causation and task diversity, respectively.

For high and low levels of occupational diversity, the use of effectual logics is positively related to performance, whereas an entrepreneur's use of effectual logics is negatively related to performance for intermediate levels of experience diversity. However, for high and low levels of industry diversity, an entrepreneur's use of effectual logics is negatively related to entrepreneurial performance. Furthermore, for intermediate levels of task diversity, an entrepreneur's use of causal logics is positively related to entrepreneurial performance, while the use of causal logics is negatively related to entrepreneurial performance for low and high levels of task diversity.

Hence, when including non-linear effects, we still fail to find support for our hypotheses. That is, we do not find the use of effectual logics to be positively related to performance when an entrepreneur's level of experience diversity is low and negatively related to performance when an entrepreneur's level of experience diversity is high. Moreover, we do not

Figure 4.1 Plot of interaction term Effectuation*Occupational diversity

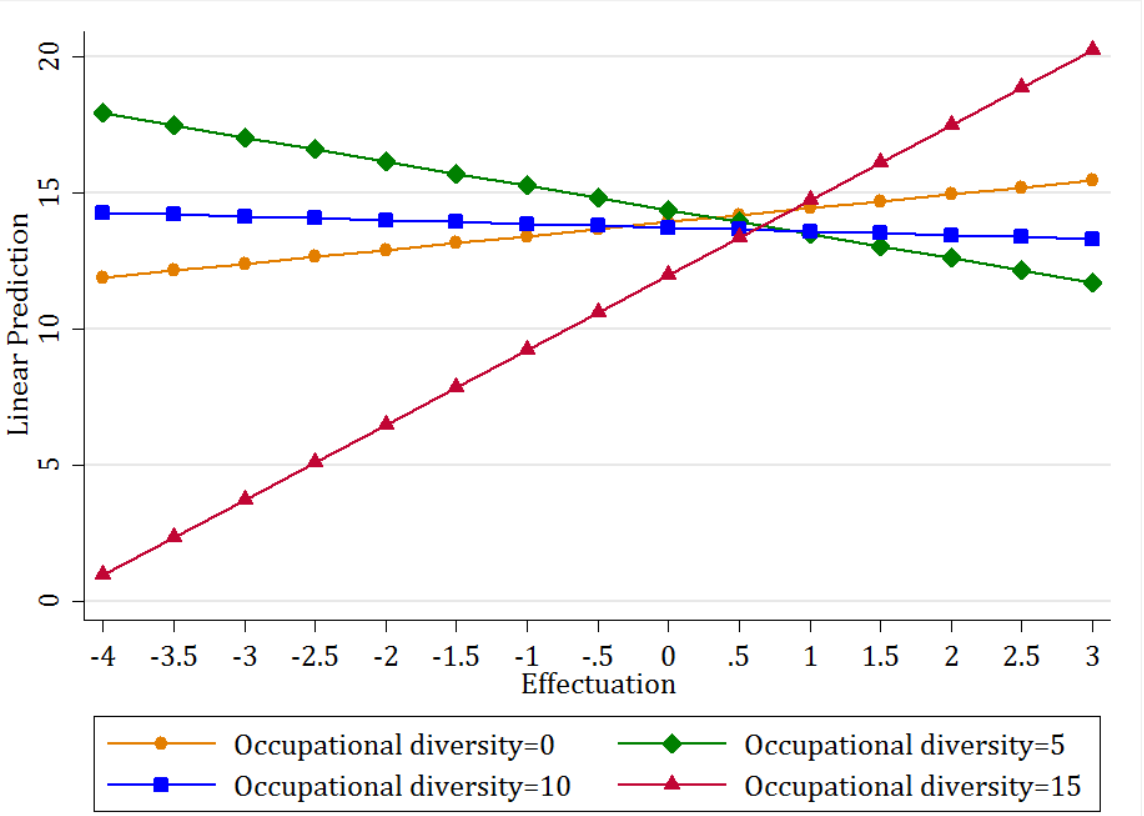


Figure 4.2 Plot of interaction term Effectuation*Industry diversity

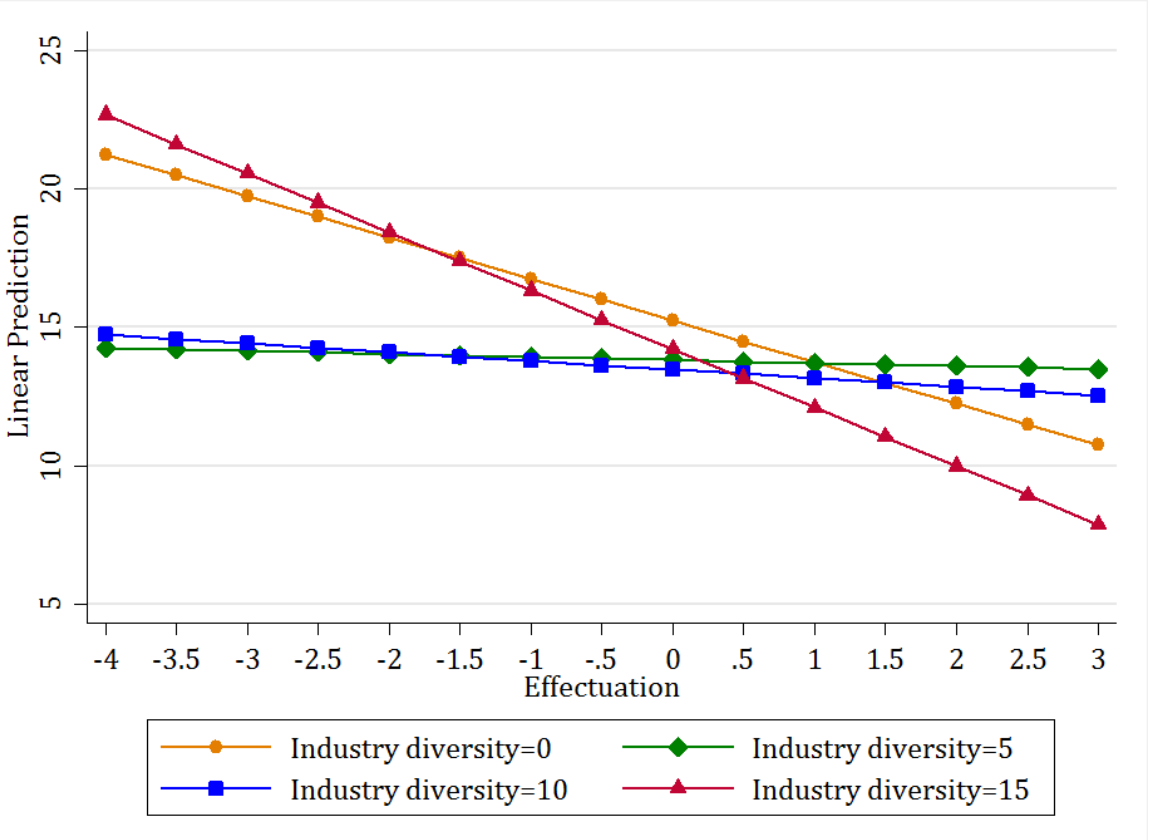
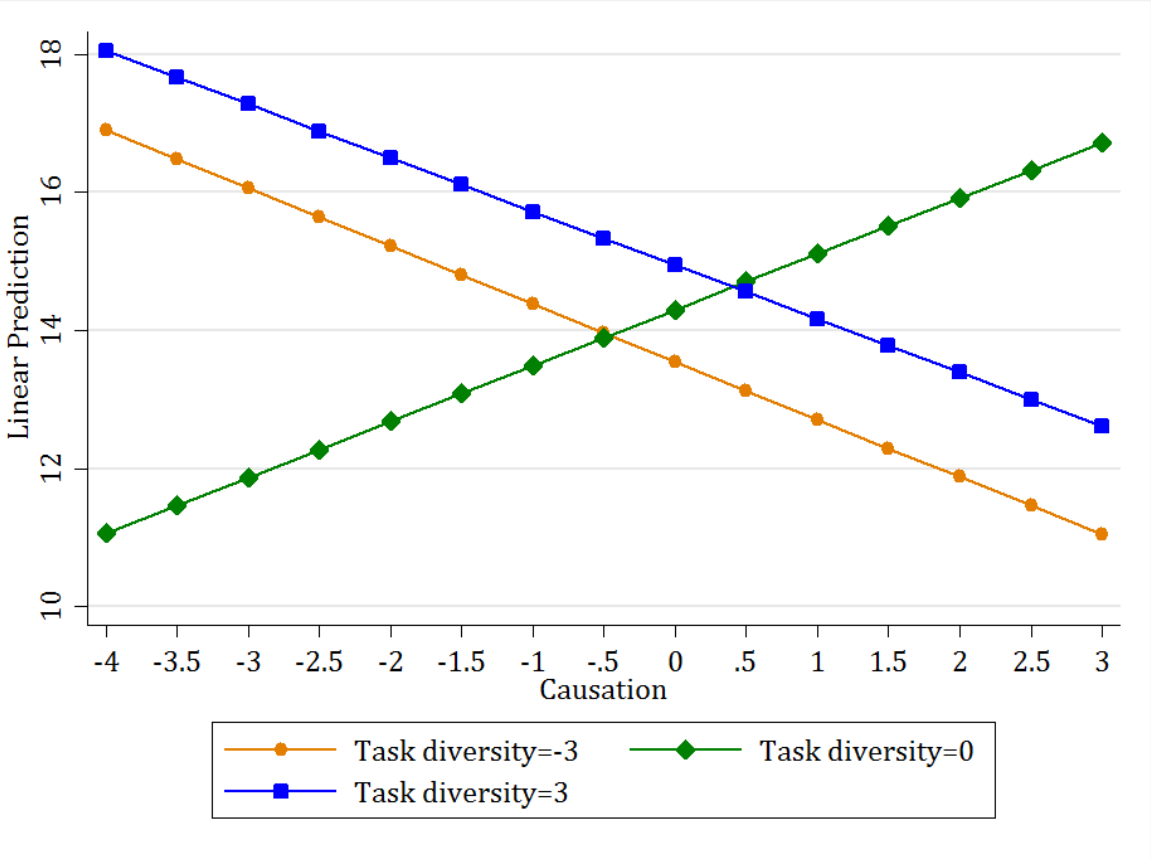


Figure 4.3 Plot of interaction term Causation*Task diversity



find that the use of causal logics is positively related to entrepreneurial performance when experience diversity is high and negatively related to performance when experience diversity is low. Instead we reveal that entrepreneur's with intermediate levels of task diversity are best of using causal logics. Furthermore, entrepreneurs with high and low levels of causal diversity are best of using effectual logics. However, entrepreneurs with low and high levels of industry diversity using effectual logics have a weaker entrepreneurial performance.

Discussion

This study explores how entrepreneurs run their business conditional on their experience diversity, and how this strategy is associated with their performance. This study's contribution is two-fold. First, we contribute to the literature on experience diversity by investigating how this diversity is

associated with the way entrepreneurs run their business in terms of causation and effectuation. Additionally, we examine how causation / effectuation interacts with experience diversity in affecting performance. The aim is to offer an explanation for the mixed findings regarding the relationship between experience diversity and performance.

Second, by way of mirror image, we add to the literature on causation / effectuation by analyzing which of the two logics is performance-enhancing conditional on experience diversity. Empirical studies on causation and effectuation mainly focus on their antecedents. Our study moves beyond Smolka et al. (2016) by including a key contingency – i.e., the entrepreneur's experience diversity – and by having a sample of adult entrepreneurs. The sample of Smolka et al. (2016) includes only student entrepreneurs, and thus only entrepreneurs with low levels of experience (diversity), whereas our sample hosts large variation in large experience diversity. Unlike the universal positive relation between effectuation, causation and performance predicted and found by Smolka et al. (2016), our results indicate that the performance effects of the use effectual logics and the use of causal logics are non-linear and dependent on the entrepreneur's level of experience diversity.

The main effects of both causation and effectuation on entrepreneurial performance are non-linear. Hence, only using effectual logics or not using effectual logics is associated with weaker entrepreneurial performance than when using some effectual logics. Additionally, the marginal plot of causation in Appendix A7 shows that an increase in the use of causal logics is positively related to entrepreneurial performance. However, the positive relationship flattens as the use of causal logics increases.

For low and high occupational diversity, the use of effectual logics is positively related to entrepreneurial performance; in contrast, for intermediate occupational diversity, the use of effectual logics is negatively associated with entrepreneurial performance. Furthermore, for intermediate levels of task diversity, the use of causal logics is positively associated with performance, while the use of causal logics is negatively related to performance for low and high task diversity. Thus, entrepreneurs scoring low on experience diversity are better off using effectual logics, whereas entrepreneurs with intermediate experience diversity are better off using causal logics. Although this outcome holds for experience diversity measured as occupational diversity and task diversity, when experience diversity is measured as industry diversity the use of effectual logics is negatively related to entrepreneurial performance regardless of an entrepreneur's level of industry diversity.

This finding is in line with one of the arguments of Arend, Sarooghi, and Burkemper (2015). They question one of the assumptions of effectuation, which is that all entrepreneurs can use effectual logics successfully. They argue that "few entrepreneurs 'can' (where most 'cannot'), so there is an economic inefficiency actually produced by effectuation where those who cannot try and do when they should not" (Arend et al., 2015: 646). This argument is in accordance with our findings on the negative moderating effect of effectuation and experience diversity. Some entrepreneurs (i.e., the ones with intermediate experience diversity) are indeed unsuccessful when using effectual logics. A possible explanation for this outcome is that if an entrepreneur adopts the strategy of her/his preference, s/he will probably be more likely to be more successful in the implementation of this strategy, and thus will have higher performance (Boone, Brabander, & van Witteloostuijn, 1996).

Our finding that effectuation is positively associated with entrepreneurial performance and causation negatively related to entrepreneurial performance if an entrepreneur's level of experience diversity is low, is in line with our theory. However, contrary to what we predicted, effectuation is also positively related to performance and causation negatively related to performance if experience diversity is high. This suggests that possessing high levels of experience diversity offers valuable resources for an entrepreneur to use effectual logics, which an entrepreneur does not yet have after reaching intermediate levels of experience diversity.

A possible explanation for this finding may be that effectuation may require more extensive knowledge regarding opportunity discovery and exploitation that can only be learned through either expert experience, thus low experience diversity, or highly diverse experiences. On the one hand, low experience diversity offers an entrepreneur detailed knowledge needed to quickly detect opportunities and deal with non-predictive strategies, which is needed to use effectual logics successfully. Effectuation includes not only opportunity detection and non-predictive strategies; it also involves building alliances. The lack of expert knowledge to deal with non-predictive strategies may be compensated by the large networks that entrepreneurs possessing high experience diversity may have built during their careers. Thus, if an entrepreneur detects an opportunity, s/he may acquire the needed knowledge and skills by building alliances using her or his network. If the expert knowledge is in their networks, entrepreneurs with high experience diversity may not need this expert knowledge themselves to successfully use effectual logics.

Not all measures of experience diversity have the same effect on entrepreneurial performance. Furthermore, this effect tends to be non-

linear in the case of industry diversity and task diversity. Task diversity is inverted U-shaped related to entrepreneurial performance. Occupational diversity and industry diversity are negatively related to entrepreneurial performance. The negative relationship between industry diversity and entrepreneurial performance weakens as industry diversity increases. In addition, the significance of the relationships between our different experience diversity measures, the interaction terms and entrepreneurial performance was not consistent across all our models, but differed depending on the sample that was used and whether interaction effects were included. The differences in significance levels may be explained by the statistical power of our analyses. That is, if the relation between experience diversity and performance is weak, we would need to increase our sample size to be able to find significant effects.

One of our study's limitations is the possible endogeneity of the use of causal logics or effectual logics and experience diversity. Furthermore, the literature on effectuation states that entrepreneurs are focused on how much they can afford to lose, and thus maximizing their profit. Additionally, we use revenue as our dependent variable, as we do not have data on profit. However, although there may be some entrepreneurs with high revenues and little profits and some entrepreneurs with high revenues and high profits, we do expect profit to be highly correlated with revenue.

Furthermore, we considered entrepreneurs to be experts when their level of experience diversity was low. However, entrepreneurs may have little experience diversity for two reasons. First, they may have little experience diversity because they have little experience. Second, they may have little experience diversity and do have significant experience, but they did not change occupations or industries during their careers. Moreover, some entrepreneurs may have high experience diversity, while having little

experience in each of the different industries they worked in and/or in each of the occupations they have had. Other entrepreneurs may have high experience diversity while having significant experience in each of the different industries they have worked in and/or in each of the occupations they have had. In this study, we do not separate between these types of entrepreneurs. However, it might influence the level of expertise entrepreneurs have. For example, an entrepreneur with little experience diversity and little experience may be less of an expert than an entrepreneur with high experience diversity and significant experience. Unfortunately, we do not have data on how many years respondents have worked in their past occupations and past industries. However, future research may give an answer to the interaction of experience and experience diversity.

Another of this study's limitations is that we do not include external contingencies. Some organizations may be active in more volatile industries than others. Sarasvathy (2001) argues that the use of effectual logics is most relevant in "dynamic, nonlinear, and ecological environments" (p. 251), and the use of causal logics is most beneficial in "static, linear, and independent environments" (p. 251). In future work, such critical external contingencies should be included. More generally, given that we only have a sample from the Netherlands in the year 2016, replication studies with other samples, in different countries and other time periods, are needed to examine the generalizability of our findings. Moreover, our study's cross-section design cannot empirically identify causalities; hence, to do so, such future replication work would benefit from adopting a longitudinal design.

Chapter 5

Discussion

Discussion of the results

In this dissertation, we aimed to gain more insight into the relationship between experience and entrepreneurial performance. To do so, we have focused on several moderators in the learning-performance relationship. We considered the possible different effects of the type of experience when studying the experience-performance relationship, i.e. industry experience, entrepreneurial experience and experience diversity. Furthermore, we analyzed conditional indirect effects on the experience-financial constraints relationship and experience-performance relationship.

In the second chapter, we analyzed whether more experienced entrepreneurs are better in convincing others and how this impacts their experienced financial constraints. Our results indicated that more experienced entrepreneurs experienced more financial constraints and considered themselves to be weaker at convincing others. However, if entrepreneurs considered themselves to be good at convincing others, they experienced less financial constraints. Chapter 2 shows that at the beginning of their careers entrepreneurs are quite confident in how good they are in convincing others. As their experience grows entrepreneurs become more realistic and reassess their “convincing others”-skills.

Nevertheless, the ones that do consider themselves to be good at convincing others experience less financial constraints.

In the third chapter, we focused on the extent to which experience diversity of entrepreneurs determines their entrepreneurial performance. While we hypothesized an inverted U-shaped relationship, we only found this relationship when not depreciating for experience. When depreciating for experience we found a positive relationship between an entrepreneur's experience diversity and his or her performance. This indicates that relatively old experiences have a negative effect on entrepreneurial performance, while more recent experiences contribute to entrepreneurial performance.

In the fourth chapter we take a closer look at the relationship between entrepreneurs' experience diversity and their entrepreneurial performance by studying how they run their business. Our findings indicate that the relationship between effectual logics and performance and that between causal logics and performance are non-linear. Furthermore, whether using effectual logics and causal logics harms or boosts an entrepreneur's entrepreneurial performance is dependent on an entrepreneurs level of experience diversity. Entrepreneurs scoring low and high on experience diversity are better off using effectual logics, whereas entrepreneurs with intermediate experience diversity are better off using causal logics. It should be noted that the significance of the relationships between the interaction terms of experience diversity and the logic used, on the one hand, and entrepreneurial performance, on the other hand, was not consistent across all our models, but changed when using a different sample.

There are two conclusions that can be drawn from our set of findings on the relationship between experience diversity and entrepreneurial

performance. First, our findings show that that our results are dependent on how we measured experience diversity. We used different measures of experience diversity in our studies: i.e., the number of industries, occupations, skills, knowledge fields and tasks. When measuring experience diversity as the number of skills and knowledge domains, we find a positive relationship when depreciation of experience is taken into account. When not taking experience diversity into account, we reveal an inverted U-shaped relationship between skill experience diversity and performance and no relationship between knowledge experience diversity and performance.

Second, our findings are dependent on what sample is used: That is, whether it involves entrepreneurs without employees(self-employed) or entrepreneurs with employees. For self-employed, we find a negative relationship when measuring experience diversity as the number of different occupations; this relationship turns insignificant for entrepreneurs with employees. Furthermore, for entrepreneurs with employees, we reveal a negative relationship between experience diversity and performance when measuring experience diversity as the number of different industries. This relationship turns insignificant when using a sample of self-employed. Moreover, when measuring experience diversity as the number of different tasks associated with their job, we find experience diversity to be inverted U-shaped related to performance when using a sample of entrepreneurs with employees. This relationship turns insignificant when using a sample of self-employed.

When looking at the results of Chapters 2 and 4 combined, entrepreneurs' "convincing others"-skills may be more valuable for effectuation than for causation. Causation is defined as processes that "take a particular effect as given and focus on selecting between means to create

that effect" (Sarasvathy, 2001: 245). Effectuation is defined as the processes that "take a set of means as given and focus on selecting between possible effects that can be created with that set of means" (Sarasvathy, 2001: 245). Whereas with causation the emphasis is put more on market research and competitive analysis, with effectuation the emphasis is put on an entrepreneur's network and, thus, his/her alliances and other cooperative strategies.

In Chapter 2 we found a negative relationship between entrepreneurial experience and *Selling yourself*. Entrepreneurs scoring high on *Selling yourself* argue that they are able to convince highly qualified individuals to work with them, have the ability to convince others to take interest in their work and are good at convincing others to financially support their work. These skills are important when using effectual logics, because of an entrepreneur's reliance on his or her networks when using effectual logics.

Implications

One of the implications of our study is that self-employed experience more financial constraints as they become more experienced with being an entrepreneur. Unfortunately, we cannot be certain as to why more experienced self-employed perceive more financial constraints. Possible implications are that they do not learn how to obtain funding as their experience grows, perhaps because the environment is so turbulent that obtaining funding is something that cannot be learned.

Another implication of our findings is that depending on whether an entrepreneur is self-employed or has employees, s/he may need different experience. Our findings show that for self-employed it is more important to have had different occupations than to have worked in different

industries, while for entrepreneurs it is more important to have experience in different industries. Moreover, self-employed with more skills and more knowledge fields tend to have higher entrepreneurial performance. However, these skills and knowledge fields should not be acquired too long ago, which implies that self-employed should not only invest in a wide variety of skills and knowledge fields before becoming an entrepreneur, but they should keep this wide variety of skills and knowledge fields up-to-date such that their acquired skills and knowledge will not fade in time.

Furthermore, entrepreneurs, regardless of whether they have employees or not, are best of using effectual logics when they have experience in very little or many different occupations. It will harm their performance if entrepreneurs with experience in an intermediate number of occupations would opt for effectual logics. Moreover, entrepreneurs with intermediate levels of task diversity will boost their performance when using causal logics, while using causal logics will harm the performance of entrepreneurs with low and high levels of task diversity.

Limitations and future research

One of the limitations of this dissertation is that we can make no claims regarding the causality of the relationship in Chapters 2 and 4. The data used in this chapter is cross-sectional, and therefore, we cannot be sure about the direction of the relationships. For example, in the second chapter we hypothesized that the better someone is at selling him/herself to others the lower his experienced financial constraints will be. However, we could also argue that how someone rates his or her skills to sell him/herself to others is influenced by his or her experienced financial constraints. Future research may shed more light on the causal effects in the context of the

relationship between experience, skills and experienced financial constraints using longitudinal data.

Another limitation is that we do not know the extent to which their experiences included failures and successes. Previous studies have indicated that the extent to which one learns from his or her experiences is dependent on the type of experience. Whereas successful experiences do not force entrepreneurs to rethink their routines and thus result in lower-level learning, failures do force entrepreneurs to re-evaluate their routines and past actions. Hence, failures trigger higher-level learning (Appelbaum & Goransson, 1997). However, because we have no information on the extent to which entrepreneurs' past experiences included failure and successes, we cannot distinguish between higher-level learning and lower-level learning.

Another reason to distinguish between failures and successes is the impact it may have on how entrepreneurs are treated by stakeholders. Entrepreneurs having a track record of failure may be treated differently by stakeholders than their counterparts having a track record of successes. Entrepreneurs having a track record of failures send out negative signals to stakeholders about an entrepreneur's competencies. Hence, these entrepreneurs may have more difficulty receiving, for example, funding in the future. However, entrepreneurs having a track record of successes may be more likely to receive the resources they need (Gompers et al., 2010; Hsu, 2007). Distinguishing between the failure experiences and success experiences may shed more light on what caused the positive relationship between experience and experienced financial constraints found in Chapter 2, and the positive relationship between entrepreneurial experience and entrepreneurial performance replicated in Chapter 4.

Furthermore, we do not include external contingencies, such as volatility of the market and the subsidy amount provided versus the amount requested. Nevertheless, these external contingencies may have been important in, for example, Chapters 2 and 4. If the demand for subsidies is very high while the amount of subsidies provided is very low, this may substantially decrease an entrepreneurs chances to successfully apply for a subsidy. This in turn may increase his or her experienced financial constraints. And perhaps it may even hurt how s/he rates his ability to sell him/herself to others. Unfortunately, we do not have data on the amount of subsidies requested and the amount of subsidies distributed. This is something future research may shed more light on.

Additionally, future research may focus more on how experienced financial constraints relate to entrepreneurial performance. Because they are measured in the same year, we do not know which leads to what. Furthermore, whether entrepreneurs value financial goals highly may play an important role in this relationship. Another important factor may be their ambitions. This makes it difficult to draw "combined conclusions" from the findings of Chapter 2 and Chapter 4.

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Appendices

A1. OLS regression results including excluding industry effects including nonlinear effects with small sample

	(1) 30%	(2) 30%	(3) 20%	(4) 20%	(5) 10%	(6) 10%	(7) No depreciation	(8) No depreciation
Gender *(male=1)*	0.391*	0.395*	0.396*	0.398*	0.411*	0.407*	0.492**	0.453*
	(0.180)	(0.180)	(0.180)	(0.180)	(0.181)	(0.181)	(0.180)	(0.182)
Age	0.669***	0.671***	0.650***	0.655***	0.618***	0.628***	0.612***	0.608***
	(0.156)	(0.156)	(0.156)	(0.156)	(0.157)	(0.157)	(0.156)	(0.157)
Age^2	-0.011***	-0.011***	-0.011***	-0.011***	-0.011***	-0.011***	-0.010***	-0.010***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Limiting health *(yes=1)*	-0.524	-0.522	-0.521	-0.522	-0.494	-0.498	-0.414	-0.433
	(0.355)	(0.356)	(0.355)	(0.356)	(0.357)	(0.357)	(0.354)	(0.356)
Marital status *(married=1)*	-0.037	-0.055	-0.041	-0.059	-0.042	-0.057	-0.057	-0.063
	(0.187)	(0.187)	(0.187)	(0.187)	(0.188)	(0.188)	(0.186)	(0.187)
Education	0.035	0.037	0.039	0.041	0.046	0.048	0.051	0.053
	(0.041)	(0.042)	(0.042)	(0.042)	(0.042)	(0.042)	(0.041)	(0.041)
Ethnicity *(Hispanic=1)*	0.773**	0.755**	0.730**	0.714**	0.687**	0.665**	0.678**	0.629*
	(0.253)	(0.251)	(0.254)	(0.252)	(0.256)	(0.254)	(0.255)	(0.254)
Ethnicity *(Black=1)*	0.365	0.367	0.365	0.362	0.370	0.363	0.380	0.375
	(0.256)	(0.256)	(0.257)	(0.257)	(0.258)	(0.258)	(0.257)	(0.259)
Hours worked per year	0.001***	0.001***	0.001***	0.001***	0.001***	0.001***	0.001***	0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Entrepreneurial experience *(in years)*	-0.445**	-0.425**	-0.325**	-0.309**	-0.215**	-0.208**	-0.148***	-0.153***
	(0.141)	(0.141)	(0.102)	(0.101)	(0.069)	(0.069)	(0.044)	(0.044)
Industry experience *(in years)*	0.362***	0.357***	0.298***	0.294***	0.220***	0.219***	0.140***	0.139***
	(0.105)	(0.105)	(0.082)	(0.083)	(0.060)	(0.060)	(0.038)	(0.038)
Knowledge experience diversity		0.037		0.008		0.007		0.056
		(0.058)		(0.057)		(0.055)		(0.048)
Knowledge experience $diversity^2$		0.001		0.002		0.001		-0.002
		(0.003)		(0.003)		(0.003)		(0.002)

Table continues on next page

A1 – *Continued*

	(1) 30%	(2) 30%	(3) 20%	(4) 20%	(5) 10%	(6) 10%	(7) No depreciation	(8) No depreciation
Skill experience diversity^2	0.000		0.001		0.000		-0.001*	
	(0.001)		(0.001)		(0.001)		(0.001)	
Constant	-3.013	-3.057	-2.798	-2.878	-2.497	-2.586	-2.811	-2.471
	(2.191)	(2.194)	(2.198)	(2.200)	(2.213)	(2.213)	(2.209)	(2.212)
Observations	496	496	496	496	496	496	496	496
R-squared	0.241	0.239	0.238	0.237	0.232	0.232	0.243	0.235
Number of ID	375	375	375	375	375	375	375	375

Standard errors in parentheses *** p<0.001, ** p<0.01, * p<0.05, t p<0.10

A2. OLS regression results including excluding industry effects and nonlinear effects with small sample

	(1) 30%	(2) 30%	(3) 20%	(4) 20%	(5) 10%	(6) 10%	(7) No depreciation	(8) No depreciation
Gender *(male=1)*	0.389*	0.394*	0.397*	0.401*	0.413*	0.412*	0.442*	0.435*
	(0.180)	(0.180)	(0.180)	(0.180)	(0.180)	(0.181)	(0.180)	(0.180)
Age	0.665***	0.668***	0.643***	0.648***	0.617***	0.623***	0.615***	0.618***
	(0.156)	(0.156)	(0.156)	(0.156)	(0.156)	(0.156)	(0.157)	(0.156)
Age^2	-0.011***	-0.011***	-0.011***	-0.011***	-0.010***	-0.011***	-0.010***	-0.011***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Limiting health *(yes=1)*	-0.516	-0.516	-0.510	-0.511	-0.491	-0.492	-0.443	-0.440
	(0.354)	(0.354)	(0.355)	(0.355)	(0.356)	(0.356)	(0.356)	(0.356)
Marital status *(married=1)*	-0.034	-0.053	-0.037	-0.054	-0.042	-0.056	-0.055	-0.064
	(0.187)	(0.187)	(0.187)	(0.187)	(0.188)	(0.187)	(0.187)	(0.187)
Education	0.034	0.036	0.038	0.040	0.046	0.047	0.056	0.055
	(0.041)	(0.041)	(0.041)	(0.041)	(0.042)	(0.042)	(0.041)	(0.041)
Ethnicity *(Hispanic=1)*	0.784**	0.758**	0.750**	0.724**	0.692**	0.672**	0.617*	0.620*
	(0.251)	(0.251)	(0.253)	(0.252)	(0.255)	(0.253)	(0.255)	(0.254)
Ethnicity *(Black=1)*	0.369	0.369	0.372	0.370	0.372	0.369	0.356	0.364
	(0.256)	(0.256)	(0.256)	(0.257)	(0.258)	(0.258)	(0.259)	(0.258)
Hours worked per year	0.001***	0.001***	0.001***	0.001***	0.001***	0.001***	0.001***	0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Entrepreneurial experience *(in years)*	-0.446**	-0.427**	-0.324**	-0.312**	-0.214**	-0.208**	-0.156***	-0.155***
	(0.141)	(0.140)	(0.101)	(0.101)	(0.069)	(0.069)	(0.045)	(0.044)
Industry experience *(in years)*	0.359***	0.355***	0.295***	0.290***	0.220***	0.217***	0.142***	0.141***
	(0.104)	(0.104)	(0.082)	(0.082)	(0.060)	(0.060)	(0.038)	(0.038)
Knowledge experience diversity		0.050**		0.042*		0.030t		0.018
		(0.018)		(0.018)		(0.017)		(0.014)
Skill experience diversity	0.023**		0.020**		0.015t		0.007	
	(0.008)		(0.008)		(0.008)		(0.007)	
Constant	-2.992	-3.033	-2.771	-2.821	-2.500	-2.563	-2.519	-2.522
	(2.189)	(2.190)	(2.196)	(2.197)	(2.211)	(2.210)	(2.219)	(2.211)
Observations	496	496	496	496	496	496	496	496
R-squared	0.232	0.239	0.238	0.236	0.233	0.232	0.233	0.234
Number of ID	375	375	375	375	375	375	375	375

Standard errors in parentheses *** p<0.001, ** p<0.01, * p<0.05, t p<0.10

A3. Testing for a self-selection bias

	(1) self-employed	(2) Ln(Income)	(3) self-employed	(4) Ln(Income)
Risk attitude	0.10696*** (0.01054)		0.10701*** (0.01054)	
Gender *(male=1)*	0.54584*** (0.05861)	0.15620 (0.25989)	0.54510*** (0.05858)	0.15953 (0.25965)
Age	0.05078*** (0.00187)	-0.15489 (0.10096)	0.05034*** (0.00189)	-0.15393 (0.10106)
Age^2		0.00233t (0.00131)		0.00233t (0.00131)
Limiting health *(yes=1)*	0.34875*** (0.07878)	-0.54777t (0.30772)	0.34924*** (0.07873)	-0.55094t (0.30797)
Marital status *(married=1)*	0.20396*** (0.04473)	0.58636** (0.18155)	0.20598*** (0.04473)	0.58536** (0.18167)
Education	-0.02813** (0.00900)	0.18508*** (0.03322)	-0.02682** (0.00899)	0.18508*** (0.03340)
Ethnicity *(Hispanic=1)*	-0.19811* (0.07773)	0.42387t (0.24984)	-0.19746* (0.07768)	0.42492t (0.24984)
Ethnicity *(Black=1)*	-0.34562*** (0.06898)	-0.01661 (0.23011)	-0.34502*** (0.06893)	-0.01020 (0.23022)
Hours worked per year		0.00065*** (0.00008)		0.00065*** (0.00008)
Entrepreneurial experience *(in years)*		-0.06422 (0.06917)		-0.06326 (0.06916)
Industry experience *(in years)*		0.10626 (0.12312)		0.10343 (0.12333)
Knowledge experience diversity	0.00985t (0.00556)	-0.06070 (0.08461)		
Knowledge experience diversity^2		0.00672 (0.00524)		
Skill experience diversity			0.00234 (0.00241)	-0.01957 (0.03777)
Skill experience diversity^2				0.00109 (0.00110)
Inverse Mills Ratio		0.06487 (0.32413)		0.06666 (0.32395)
Constant	-4.88503*** (0.15713)	6.53146** (2.43953)	-4.87740*** (0.15682)	6.46689** (2.43700)
Observations	31,739	1,926	31,739	1,926
R^2				
Number of ID	7,014	1,141	7,014	1,141

Standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05, t p<0.10

A4. OLS regression results including a non-linear effect of working experience

	(1)	(2)
Gender *(male=1)*	0.12779	0.12570
	(0.16491)	(0.16490)
Age	-0.22338*	-0.22389*
	(0.09916)	(0.09918)
Age^2	0.00276*	0.00278*
	(0.00129)	(0.00129)
Limiting health *(yes=1)*	-0.36125	-0.36127
	(0.28051)	(0.28056)
Marital status *(married=1)*	0.52483**	0.52368**
	(0.16089)	(0.16091)
Education	0.17742***	0.17572***
	(0.03074)	(0.03053)
Ethnicity *(Hispanic=1)*	0.50459*	0.50569*
	(0.21988)	(0.21984)
Ethnicity *(Black=1)*	0.15657	0.15957
	(0.19837)	(0.19823)
Work experience	0.14272t	0.14120t
	(0.08165)	(0.08170)
Work experience^2	-0.00296	-0.00293
	(0.00345)	(0.00345)
Hours worked per year	0.00061***	0.00061***
	(0.00008)	(0.00008)
Entrepreneurial experience *(in years)*	-0.09532	-0.09397
	(0.06586)	(0.06587)
Industry experience *(in years)*	0.09953	0.10006
	(0.10902)	(0.10908)
Knowledge experience diversity		-0.04924
		(0.07414)
Knowledge experience diversity^2		0.00401
		(0.00443)
Skill experience diversity	-0.02978	
	(0.03382)	
Skill experience diversity^2	0.00105	
	(0.00096)	
Constant	7.88301***	7.88555***
	(1.68754)	(1.68956)
Observations	2,120	2,120
R^2		
Number of ID	1,304	1,304

Standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05, t p<0.10

A5. OLS regression results with the separate factors of effectuation

	all		only self-employed		without self-employed	
	(1)	(2)	(3)	(4)	(5)	(6)
Experimentation	-0.567***	-0.560**	-0.529***	-0.424*	-0.523***	-0.605t
	(0.084)	(0.177)	(0.097)	(0.214)	(0.147)	(0.313)
Affordable Loss	-0.244**	-0.415*	-0.298**	-0.807***	-0.164	0.025
	(0.087)	(0.178)	(0.095)	(0.210)	(0.166)	(0.327)
Flexibility	-0.085	-0.181	0.140	0.132	-0.413*	-0.171
	(0.089)	(0.180)	(0.097)	(0.214)	(0.171)	(0.332)
Precommitments	0.403***	0.488*	0.501***	1.029***	0.210	-0.339
	(0.100)	(0.211)	(0.109)	(0.241)	(0.192)	(0.408)
Causation	0.556***	0.433*	0.480***	0.340	0.692***	0.415
	(0.105)	(0.219)	(0.114)	(0.258)	(0.206)	(0.420)
Occupational diversity	-0.041	-0.035	-0.149**	-0.149**	0.182t	0.149
	(0.049)	(0.050)	(0.053)	(0.055)	(0.099)	(0.113)
Experimentation*Occupational diversity		-0.018		0.017		-0.126
		(0.042)		(0.047)		(0.079)
Affordable Loss*Occupational diversity		0.055		0.121**		-0.018
		(0.043)		(0.046)		(0.088)
Flexibility*Occupational diversity		-0.036		-0.046		-0.027
		(0.043)		(0.046)		(0.089)
Precommitments*Occupational diversity		-0.009		-0.095t		0.101
		(0.052)		(0.054)		(0.110)
Causation*Occupational diversity		0.036		-0.032		0.140
		(0.049)		(0.052)		(0.110)
Industry diversity	-0.135**	-0.141**	-0.029	-0.025	-0.331***	-0.417***
	(0.048)	(0.049)	(0.050)	(0.051)	(0.100)	(0.125)
Experimentation*Industry diversity		0.020		-0.044		0.184*
		(0.041)		(0.045)		(0.081)
Affordable Loss*Industry diversity		-0.012		0.010		-0.047
		(0.043)		(0.045)		(0.088)
Flexibility*Industry diversity		0.063		0.050		-0.012
		(0.045)		(0.046)		(0.101)
Precommitments*Industry diversity		-0.017		-0.039		0.057
		(0.051)		(0.055)		(0.108)
Causation*Industry diversity		-0.003		0.074		-0.040
		(0.052)		(0.054)		(0.117)

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A5 – *Continued*

	all		only self-employed		without self-employed	
	(1)	(2)	(3)	(4)	(5)	(6)
Task diversity	0.131	0.147	-0.007	0.014	0.274	0.408*
	(0.092)	(0.093)	(0.103)	(0.106)	(0.171)	(0.185)
Experimentation*Task diversity		-0.014		0.036		-0.052
		(0.071)		(0.088)		(0.134)
Affordable Loss*Task diversity		0.098		0.039		0.086
		(0.074)		(0.086)		(0.150)
Flexibility*Task diversity		-0.192**		-0.037		-0.208
		(0.074)		(0.085)		(0.157)
Precommitments*Task diversity		-0.018		0.043		0.033
		(0.084)		(0.098)		(0.172)
Causation*Task diversity		-0.009		-0.016		-0.291t
		(0.083)		(0.100)		(0.176)
Number of employees	0.000	0.000			0.000	0.000
	(0.000)	(0.000)			(0.000)	(0.000)
Total working experience	0.125***	0.124***	0.142***	0.145***	0.049	0.051
	(0.022)	(0.022)	(0.024)	(0.024)	(0.043)	(0.043)
Working experience in current profession	0.042**	0.044**	0.048**	0.050**	0.064*	0.067*
	(0.015)	(0.015)	(0.018)	(0.018)	(0.029)	(0.029)
Gender (female=1)	-1.975***	-1.994***	-2.377***	-2.370***	-1.376***	-1.418***
	(0.209)	(0.210)	(0.224)	(0.225)	(0.415)	(0.417)
Age	-0.088***	-0.088***	-0.102***	-0.105***	-0.028	-0.031
	(0.016)	(0.016)	(0.018)	(0.018)	(0.031)	(0.031)
Age of organization	0.073***	0.072***	0.042*	0.043**	0.069***	0.069***
	(0.007)	(0.007)	(0.016)	(0.016)	(0.009)	(0.009)
Education (vocational education=1)	-1.091*	-1.108*	-0.994t	-1.025t	-1.154	-1.287t
	(0.435)	(0.436)	(0.524)	(0.526)	(0.729)	(0.731)
Education (polytechnic education=1)	-0.151	-0.151	0.168	0.150	-0.540	-0.608
	(0.387)	(0.388)	(0.460)	(0.460)	(0.662)	(0.664)
Education (university=1)	0.947*	0.934*	1.362**	1.341**	0.359	0.212
	(0.400)	(0.400)	(0.476)	(0.476)	(0.682)	(0.687)
Education (PhD=1)	0.881	0.876	1.238	1.238	0.135	0.042
	(0.725)	(0.727)	(0.839)	(0.842)	(1.276)	(1.285)
Role (broker=1)	0.077	0.070	0.473t	0.492t	-0.540	-0.478
	(0.254)	(0.254)	(0.276)	(0.276)	(0.500)	(0.501)

Table continues on next page

A5 – *Continued*

	all		only self-employed		without self-employed	
	(1)	(2)	(3)	(4)	(5)	(6)
Role (producer=1)	0.665*	0.636*	-0.165	-0.196	1.842**	1.820**
	(0.304)	(0.304)	(0.341)	(0.341)	(0.563)	(0.565)
Role (distributor=1)	0.940**	0.912**	1.008*	0.902*	0.765	0.783
	(0.312)	(0.313)	(0.402)	(0.402)	(0.504)	(0.506)
Role (media outlet=1)	-1.564*	-1.574*	-1.303t	-1.186t	-1.380	-1.312
	(0.612)	(0.613)	(0.708)	(0.709)	(1.083)	(1.087)
Role (education=1)	-1.476***	-1.486***	-0.829***	-0.839***	-3.002***	-2.946***
	(0.245)	(0.246)	(0.245)	(0.246)	(0.570)	(0.572)
Role (service provider=1)	1.112***	1.094***	1.338***	1.364***	0.759t	0.747t
	(0.211)	(0.211)	(0.232)	(0.233)	(0.409)	(0.410)
Export (yes=1)	0.234	0.251	0.192	0.190	0.501	0.423
	(0.206)	(0.207)	(0.234)	(0.234)	(0.374)	(0.377)
Importance of suppliers as partner	0.067	0.071	0.058	0.058	0.172	0.168
	(0.056)	(0.056)	(0.057)	(0.057)	(0.122)	(0.123)
Importance of customers as partner	0.248**	0.241*	0.342**	0.326**	0.020	0.016
	(0.095)	(0.095)	(0.107)	(0.107)	(0.174)	(0.175)
Importance of competitors as partner	0.037	0.039	-0.009	-0.006	0.104	0.093
	(0.063)	(0.063)	(0.069)	(0.069)	(0.119)	(0.120)
Importance of intermediaries/agents as partner	0.051	0.052	0.009	0.007	0.089	0.099
	(0.053)	(0.053)	(0.058)	(0.058)	(0.102)	(0.103)
Self-employed	-6.135***	-6.129***				
	(0.226)	(0.227)				
Agriculture	2.952***	2.892***	4.051***	4.137***	1.573	1.476
	(0.776)	(0.779)	(1.099)	(1.101)	(1.241)	(1.249)
Mining	3.987	4.161			4.304	4.390
	(5.422)	(5.428)			(6.376)	(6.377)
Manufacturing	1.679**	1.676**	-0.330	-0.470	2.484*	2.443*
	(0.631)	(0.632)	(0.803)	(0.803)	(1.083)	(1.087)
Electricity	7.336t	7.360t			5.739	5.746
	(3.862)	(3.866)			(4.589)	(4.595)
Water supply	1.857	1.986	-3.350	-3.517	6.981	6.692
	(3.856)	(3.858)	(4.661)	(4.660)	(6.399)	(6.396)
Construction	3.189***	3.167***	3.734***	3.729***	2.604*	2.522t
	(0.733)	(0.733)	(0.852)	(0.852)	(1.314)	(1.317)

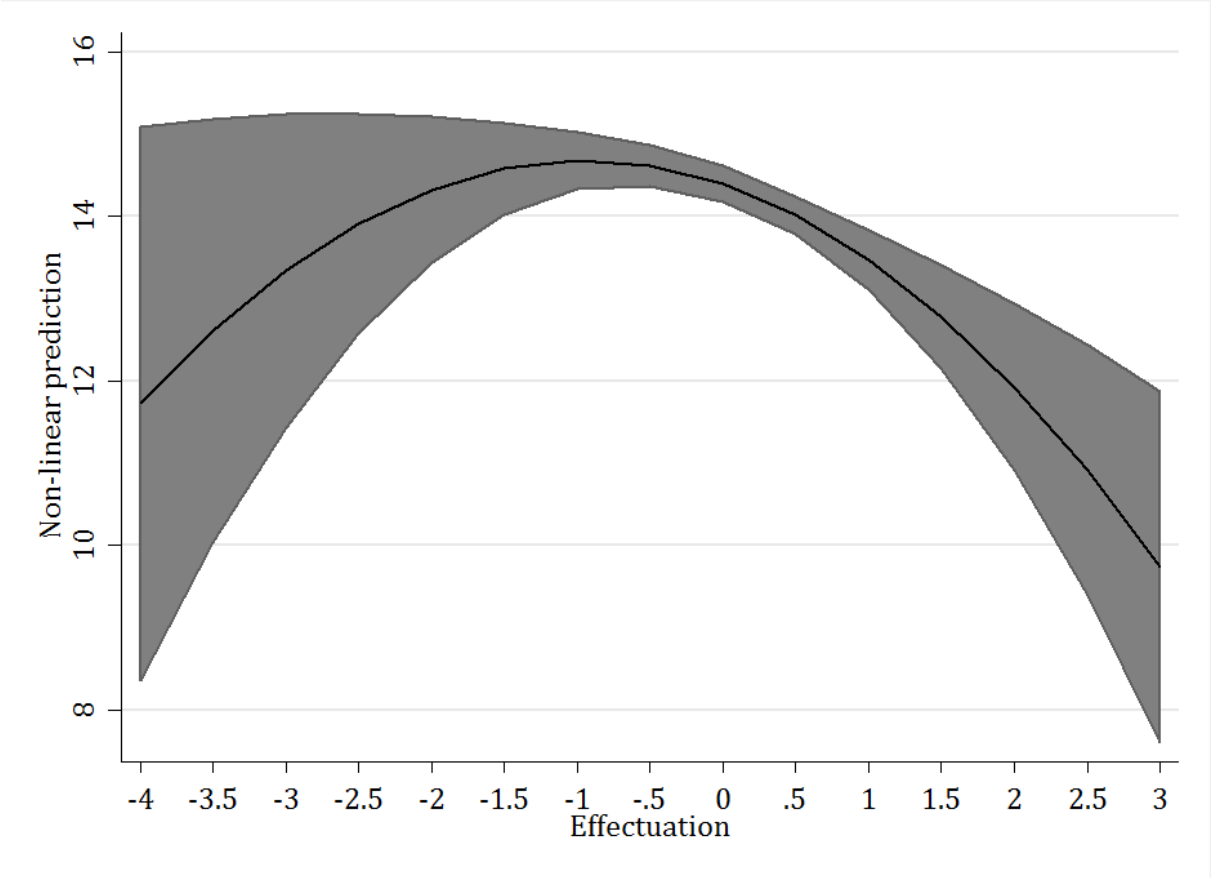
Table continues on next page

A5 – *Continued*

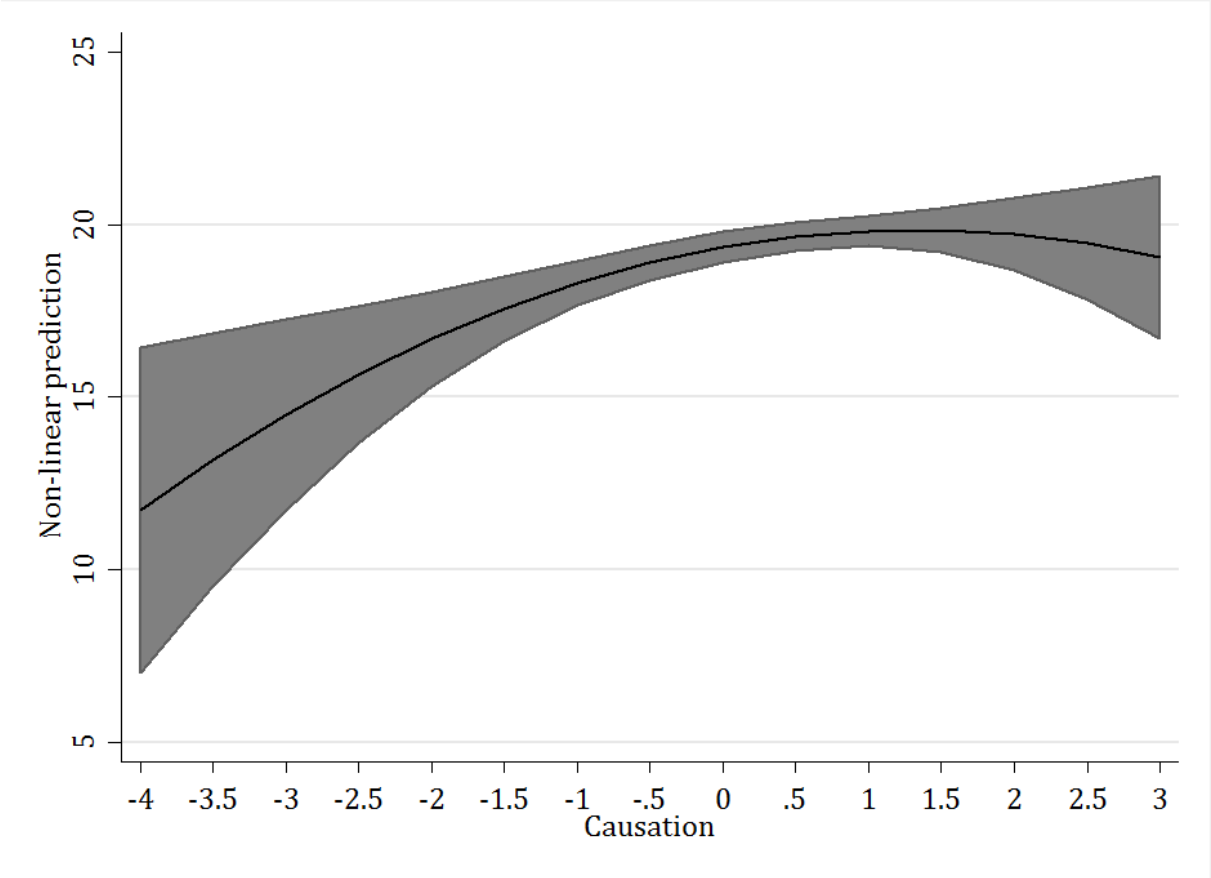
	all		**only self-employed**		**without self-employed**	
	(1)	(2)	(3)	(4)	(5)	(6)
Wholesale	3.093***	3.133***	2.908***	2.942***	3.015***	2.959***
	(0.486)	(0.487)	(0.595)	(0.596)	(0.886)	(0.890)
Transportation	3.417*	3.397*	3.947	4.319	3.445t	3.499t
	(1.412)	(1.414)	(3.300)	(3.303)	(1.877)	(1.882)
Accommodation	1.711*	1.674*	0.936	1.173	1.929	1.813
	(0.838)	(0.839)	(1.390)	(1.393)	(1.261)	(1.264)
Information	0.727	0.777t	1.158*	1.203*	-0.068	-0.015
	(0.452)	(0.453)	(0.474)	(0.475)	(0.932)	(0.936)
Finance	2.401**	2.409**	2.290t	2.259t	2.439*	2.544*
	(0.740)	(0.742)	(1.301)	(1.302)	(1.126)	(1.135)
Real estate	0.726	0.774	0.275	0.355	1.225	1.054
	(1.059)	(1.060)	(1.343)	(1.342)	(1.723)	(1.730)
Consultancy	1.881***	1.894***	1.934***	1.924***	1.823*	1.729*
	(0.378)	(0.378)	(0.390)	(0.391)	(0.803)	(0.809)
Goods and services	1.969**	1.991***	0.934	0.779	3.068**	3.047**
	(0.599)	(0.600)	(0.701)	(0.703)	(1.076)	(1.081)
Public administration	2.700	2.379	-1.442	-1.770	7.254	7.158
	(3.852)	(3.857)	(4.656)	(4.664)	(6.398)	(6.407)
Education	1.667**	1.696**	1.640**	1.633**	2.173t	2.095t
	(0.558)	(0.559)	(0.589)	(0.589)	(1.135)	(1.142)
Health	1.100*	1.173*	0.669	0.694	2.211*	2.420*
	(0.512)	(0.513)	(0.540)	(0.541)	(1.049)	(1.054)
Culture	-0.021	-0.023	0.121	0.105	0.123	-0.026
	(0.432)	(0.433)	(0.436)	(0.436)	(0.989)	(0.993)
Constant	14.563***	14.627***	8.302***	8.465***	13.932***	14.594***
	(0.969)	(0.972)	(1.108)	(1.114)	(1.738)	(1.752)
Observations	3,513	3,513	2,106	2,106	1,407	1,407
R-squared	0.459	0.461	0.250	0.257	0.193	0.204

Standard errors in parentheses *** p<0.001, ** p<0.01, * p<0.05, t p<0.10

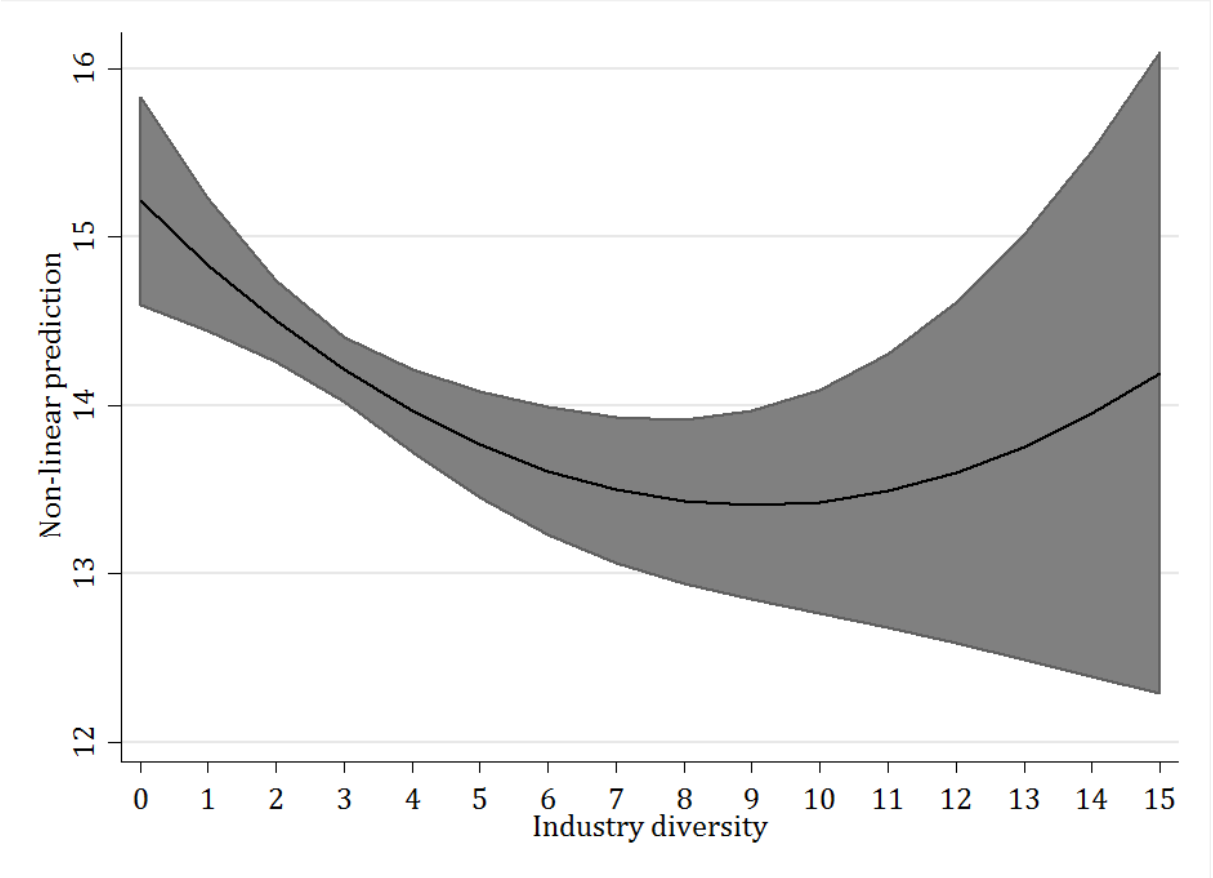
A6. Marginal effect of effectuation



A7. Marginal effect of causation



A8. Marginal effect of industry diversity



A9. Marginal effect of task diversity